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ABSTRACT

This document contains 519 criterion-referenced multiple choice and true or false test items for a course in electronics. The test item bank is designed to work with both the Vocational Instructional Management System (VIMS) and the Vocational Administrative Management System (VAMS) in Missouri. The items are grouped into 15 units covering the following topics: electronic safety; fundamentals of electronics; AC power supply; semiconductor devices; amplifiers; frequency generation; receivers and transmitters; test equipment; microprocessor and computer systems; optical electronics; digital logic application; electromechanical devices and controllers; circuit construction techniques; logical steps of troubleshooting; and leadership. The 28 references used in constructing the test item bank are listed, and electronic diagrams needed for the test questions are provided. The following information is provided for each test item: unique item number; duty area and task number (Missouri competency profile); letter of correct answer; source; date; learning domain (cognitive, affective, psychomotor); writer(s)/reviewer(s); and accompanying artwork. (KC)

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Criterion-Referenced Test Items for

ELECTRONICS

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Criterion-Referenced Test (CRT) Items for
ELECTRONICS

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FOREWORD

Rapid advances in technology are placing heavy demands on both teachers and students in vocational education. These Criterion-Referenced Test Items for Electronics are designed to help meet those demands.

All test writers face one basic challenge: to produce test items that accurately measure what they are intended to measure. This challenge was kept firmly in mind by all those who participated in the development of the bank. The items in the bank are based upon competencies found on the Missouri Electronics Competency Profile. Much care was taken to ensure that the test items will accurately measure a student's knowledge in regard to these competencies. Every effort was made to ensure the items are presented in a fair and unbiased matter.

The items in this book are designed to work with both the Vocational Instructional Management System (VIMS) and VAMS. The test item bank will allow instructors and administrators to manage testing and evaluation activities in the most efficient way possible. Instructors pulling items from this bank for individual tests should still evaluate the new test to see that one question does not give away the answer to another question. For word processing and test-item generation purposes, an ASCII disk of the item bank has been included with this printed copy.

This test bank should be viewed as a beginning. It is hoped that future revisions and additions will build the bank into an even more powerful and reliable evaluation and management tool.

Judith Moore, supervisor
Industrial Education
Department of Elementary and Secondary Education

Charles "Chuck" Waibel, director
Industrial Education
Department of Elementary and Secondary Education

ACKNOWLEDGMENTS

These Criterion-Referenced Test (CRT) Items for Electronics represent a continuing commitment to Missouri's Vocational Instructional Management System (VIMS). The bank is keyed to the Electronics Competency Profile developed by industry and education professionals in the state. The cycle of curriculum development includes the following steps:

1. Development of the competency profile
2. Instructional analysis
3. Search for existing materials and/or a crosswalk of existing curriculum materials to the competency profile
4. Development of the curriculum guide
5. Field-test of the curriculum guide
6. Development of mediated curriculum (videos)
7. Development of the test-item bank

To ensure that test items are firmly based on information available to students, development of the test-item bank is the final component in the development cycle.

These teachers contributed as writers and advisory committee members.

Ron Boyer, Jefferson College
Barry Charter, Crowder College
Don Mallory, Cass County AVTS
C. Paul Miller, Monett AVTS
Mark Murphy, Davis H. Hart Mexico AVTS
Ralph "Randy" Muselman, Kirksville AVTS
Don Waters, Carthage AVTS

These CRTs were technically reviewed and/or field-tested by the following educators.

Charles Oviatt, educational consultant, Vienna, Mo.
Ron Boyer, Jefferson College
Don Mallory, Cass County AVTS
Mark Murphy, Davis H. Hart Mexico AVTS
Ralph "Randy" Muselman, Kirksville AVTS
Don Waters, Carthage AVTS

Support and contributions of IML staff members were instrumental to this project's development.

Harley Schlichting, director
Amon Herd, associate director
Phyllis Miller and Dan Stapleton, assistant directors
Fiona Gammonley, graphic artist II
Lori Holliday, word processor III

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VICA	Goodrick, Bill. Missouri VICA Curriculum Guide. University of Missouri-Columbia: Instructional Materials Laboratory, 1986.

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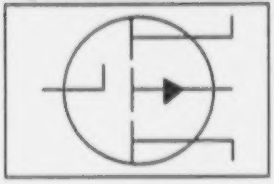
8. Maintain a good professional appearance
9. Perform basic tasks related to securing and terminating employment
10. Perform basic parliamentary procedures in a group meeting

ARTWORK FOR ELECTRONICS CRT QUESTIONS, 1991

Instructional Materials Laboratory, Columbia, MO

Figure B17.1



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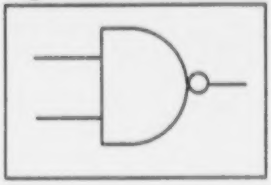

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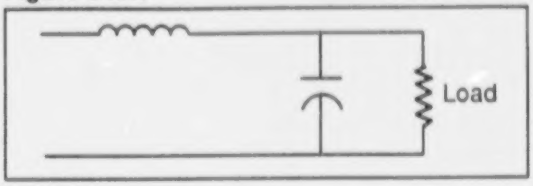

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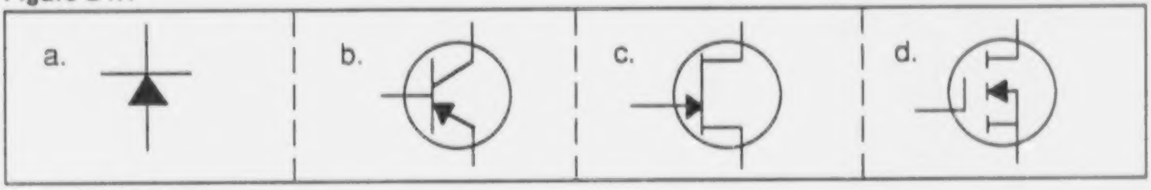

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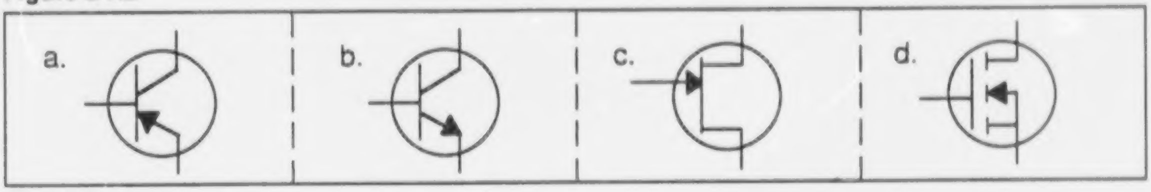

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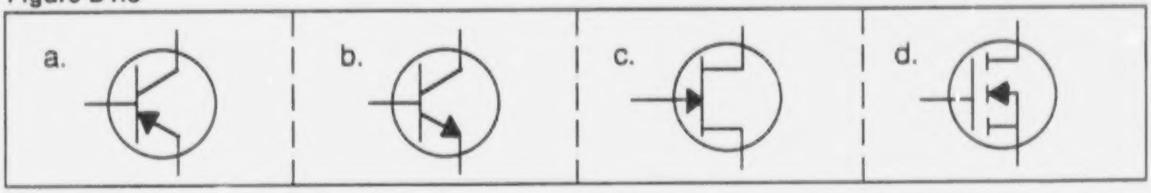

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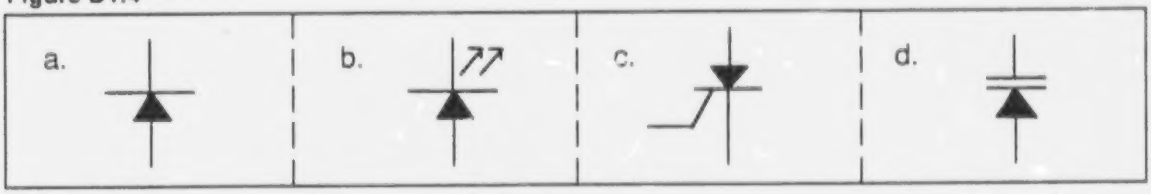

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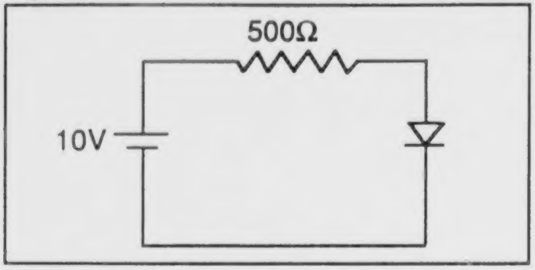

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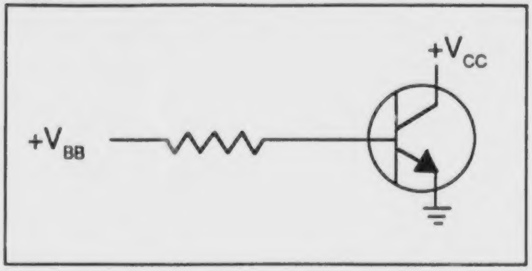

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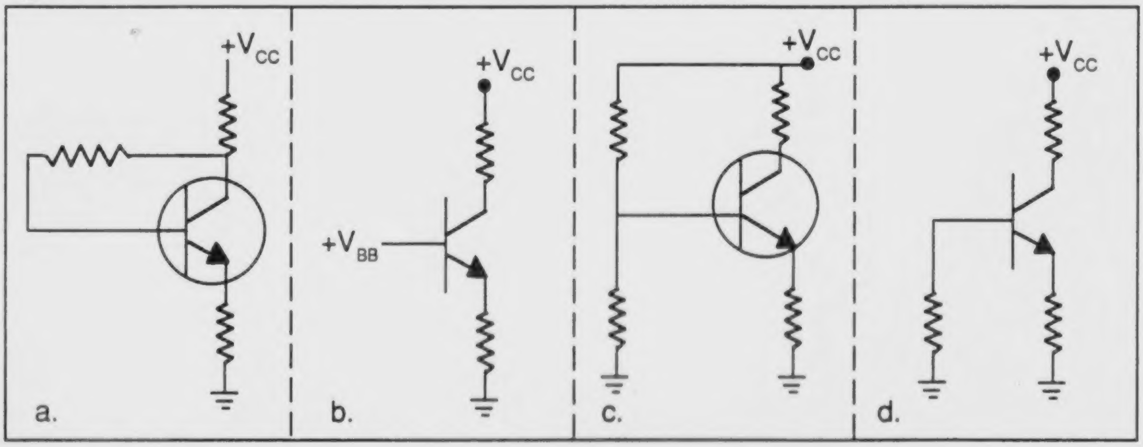
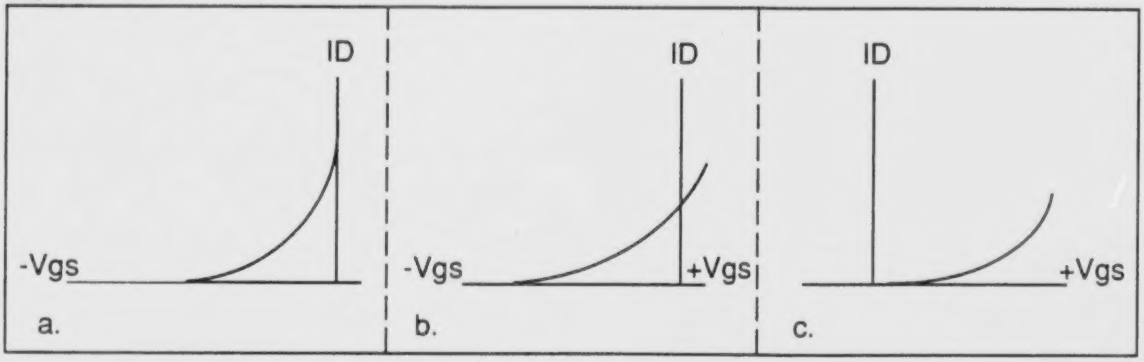

+V$_{CC}$
+V$_{BB}$
a.
b.
c.
d.

Figure D6.1



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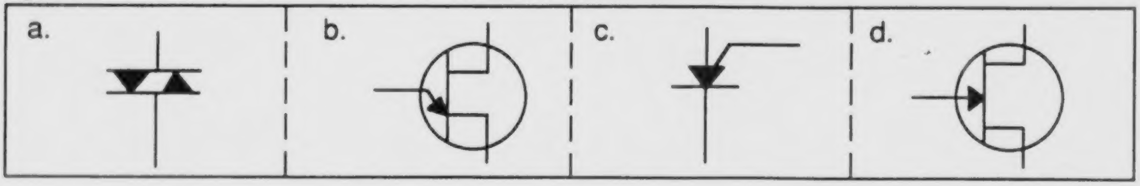

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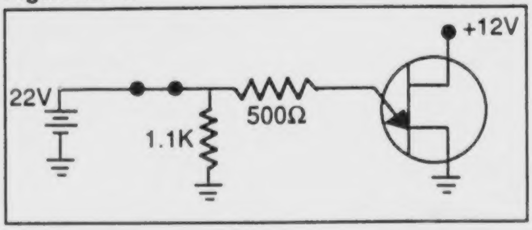
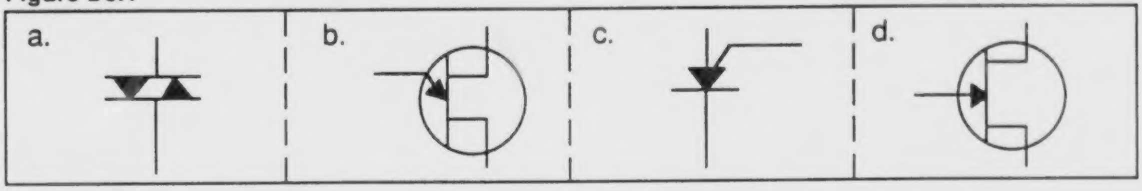

+12V
22V
1.1K
500Ω

Figure D8.1



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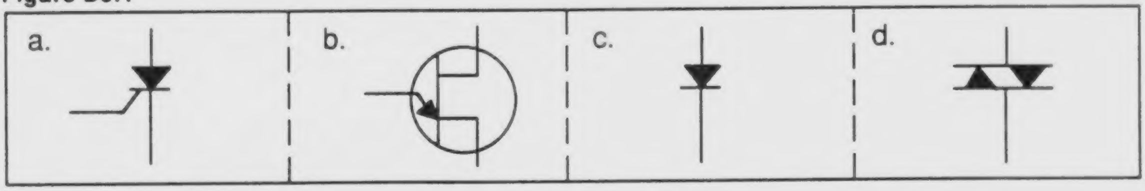

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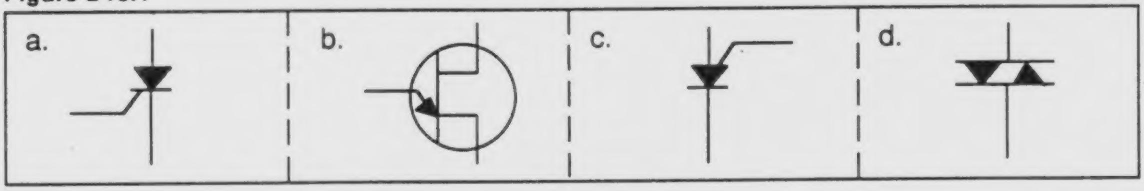

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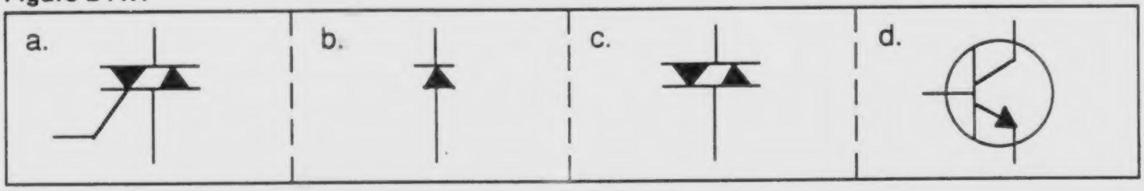

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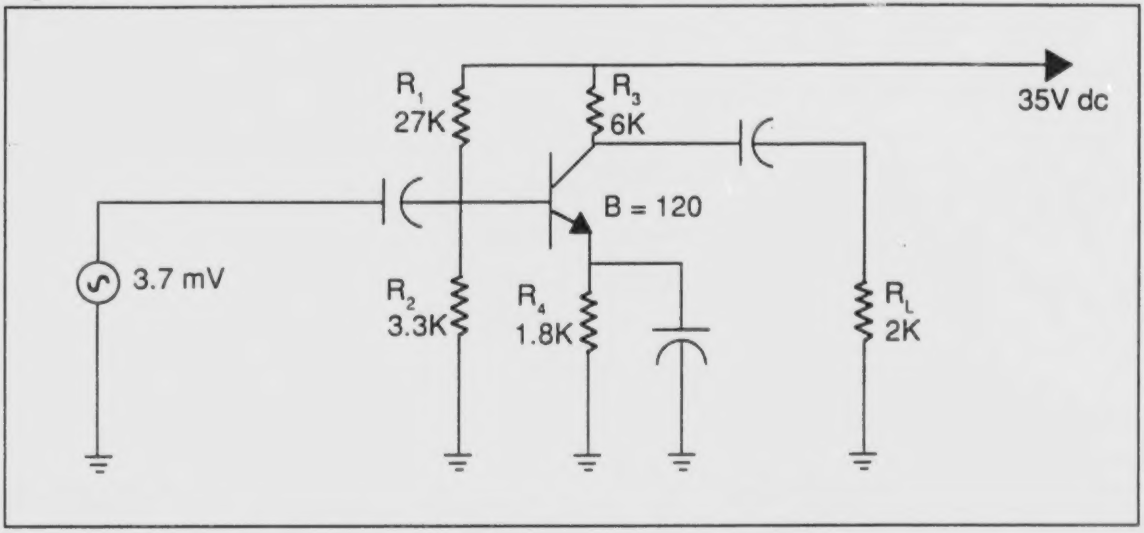

R1
27K
R3
6K
35V dc
B = 120
3.7 mV
R2
3.3K
R4
1.8K
RL
2K

Figure E3.1

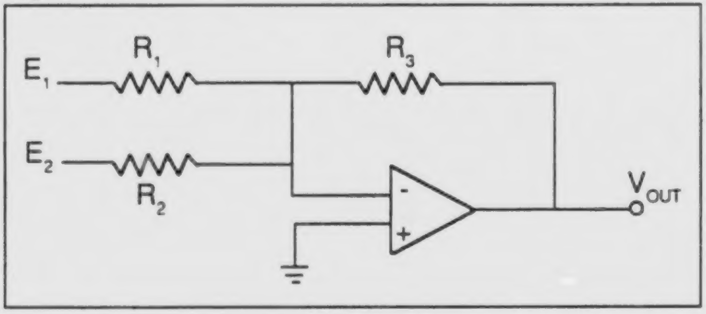
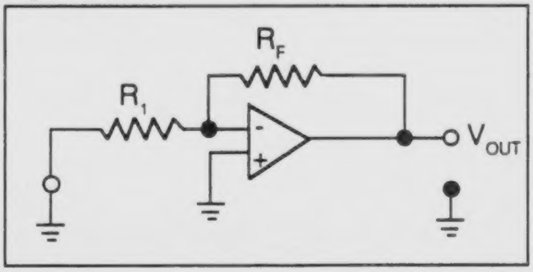

E1
R1
R3
E2
R2
VOUT
-
+

Figure E6.1



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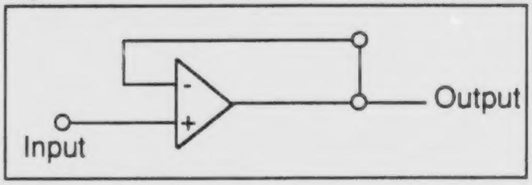

-
+
Output
Input

Figure E6.3

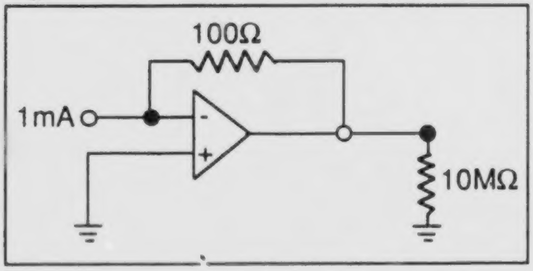

100Ω
1mA
-
+
10MΩ

Figure J5.1

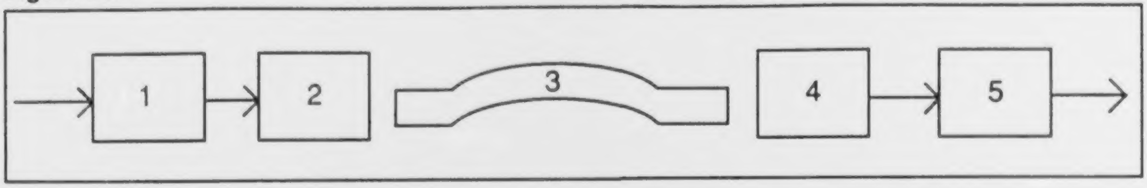


Figure K3.1

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

a.

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

b.

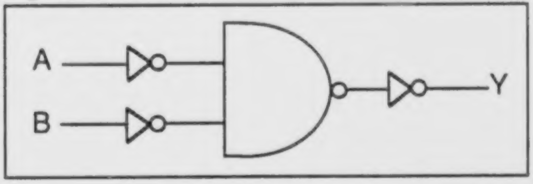
A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

c.

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

d.

Figure K3.2



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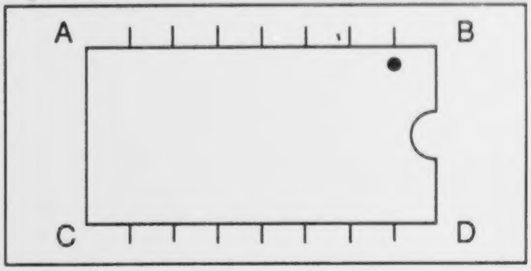


Figure K4.1

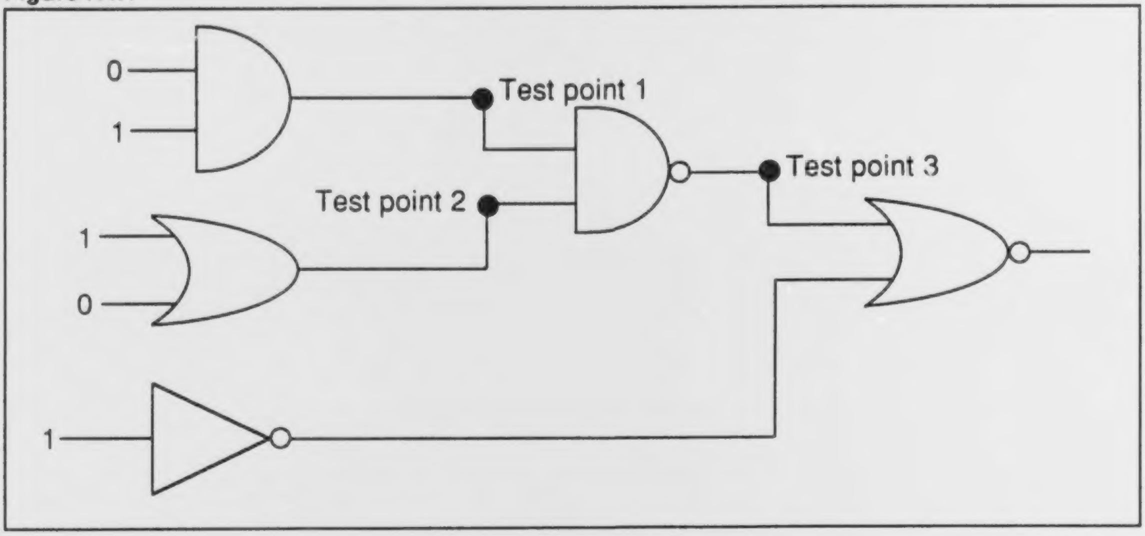

0
1
Test point 1
Test point 2
1
0
Test point 3
1

Figure K7.1

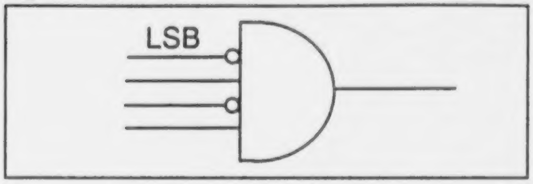


Figure K12.1

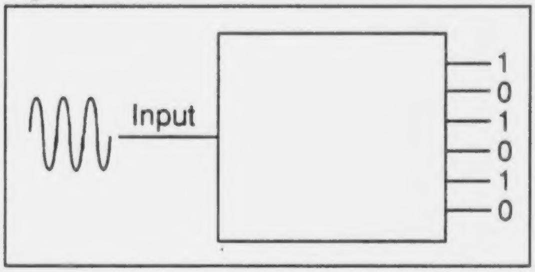

Input
1
0
1
0
1
0

Figure N1.1

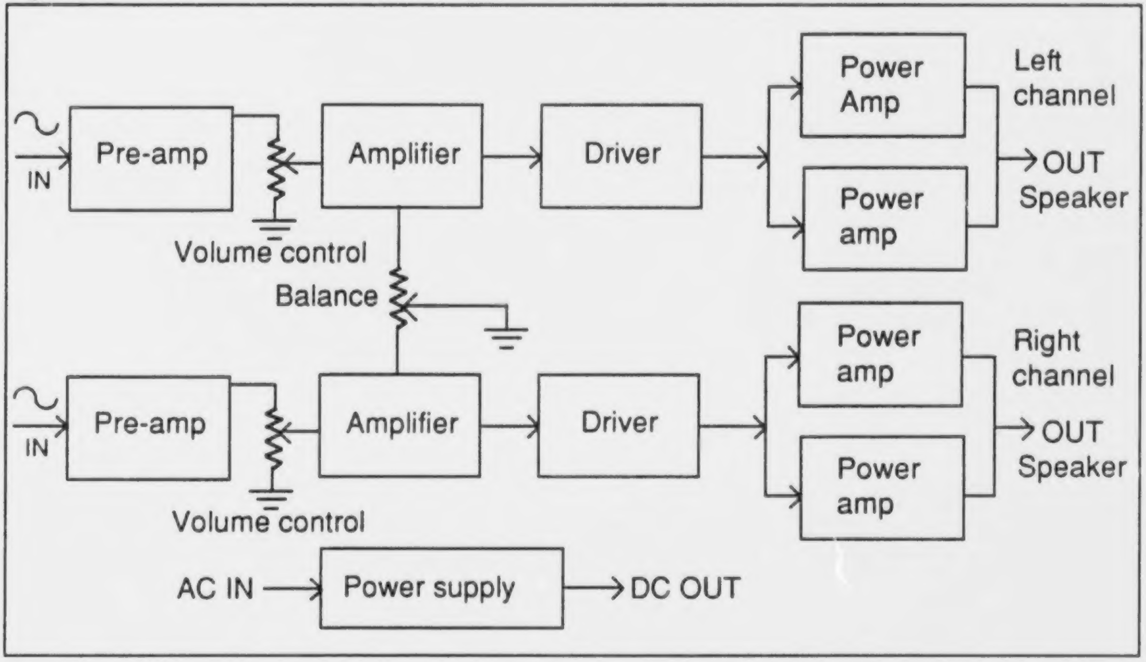

IN
Pre-amp
Volume control
Amplifier
Driver
Power Amp
Power amp
Left channel
OUT Speaker
Balance
IN
Pre-amp
Volume control
Amplifier
Driver
Power amp
Power amp
Right channel
OUT Speaker
AC IN
Power supply
DC OUT

Figure N1.2

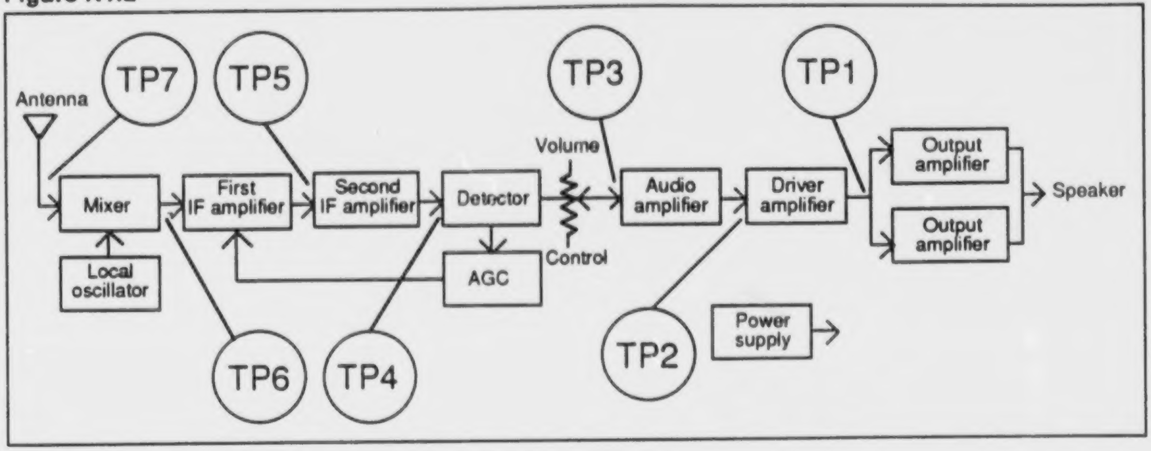
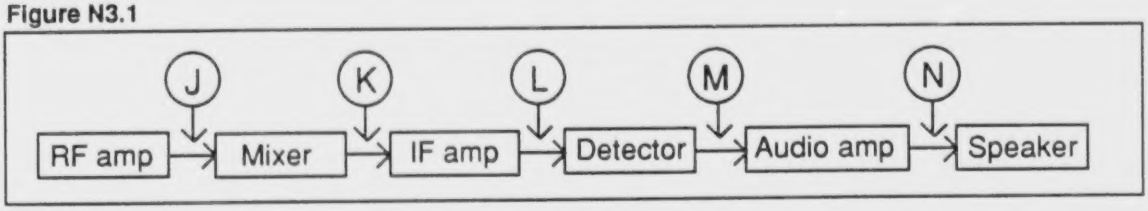

TP7
TP5
TP3
TP1
Antenna
Volume
Mixer
First IF amplifier
Second IF amplifier
Detector
Audio amplifier
Driver amplifier
Output amplifier
Output amplifier
Speaker
Local oscillator
AGC
Control
Power supply
TP6
TP4
TP2

Figure N3.1


J
K
L
M
N
RF amp
Mixer
IF amp
Detector
Audio amp
Speaker

18

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190

54/74190
54LS/74LS190

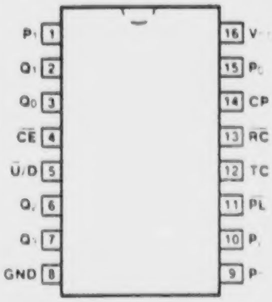
UP/DOWN DECADE COUNTER

(With Preset and Ripple Clock)

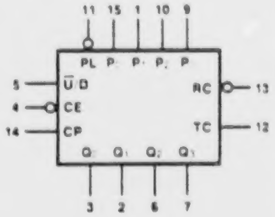
DESCRIPTION — The '190 is a reversible BCD (8421) decade counter featuring synchronous counting and asynchronous presetting. The preset feature allows the '190 to be used in programmable dividers. The Count Enable input, the Terminal Count output and the Ripple Clock output make possible a variety of methods of implementing multi-stage counters. In the counting modes, state changes are initiated by the rising edge of the clock.

- **HIGH SPEED — 30 MHz TYPICAL COUNT FREQUENCY**
- **SYNCHRONOUS COUNTING**
- **ASYNCHRONOUS PARALLEL LOAD**
- **CASCADABLE**

CONNECTION DIAGRAM
PINOUT A



LOGIC SYMBOL



V_{CC} = Pin 16
GND = Pin 8

MODE SELECT TABLE

INPUTS				MODE
$\overline{PL}$	$\overline{CE}$	$\overline{U}/D$	CP	
H	L	L	↑	Count Up
H	L	H	↑	Count Down
L	X	X	X	Preset (Asyn.)
H	H	X	X	No Change (Hold)

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

RC TRUTH TABLE

INPUTS			OUTPUT
$\overline{CE}$	TC*	CP	$\overline{RC}$
L	H	⊔	⊔
H	X	X	H
X	L	X	H

*TC is generated internally

INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

PIN NAMES	DESCRIPTION	54/74 (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
$\overline{CE}$	Count Enable Input (Active LOW)	3.0/3.0	1.5/0.75
CP	Clock Pulse Input (Active Rising Edge)	1.0/1.0	0.5/0.25
$P_0 - P_3$	Parallel Data Inputs	1.0/1.0	0.5/0.25
$\overline{PL}$	Asynchronous Parallel Load Input (Active LOW)	1.0/1.0	0.5/0.25
$\overline{U}/D$	Up/Down Count Control Input	1.0/1.0	0.5/0.25
$Q_0 - Q_3$	Flip-flop Outputs	20/10	10/5.0 (2.5)
$\overline{RC}$	Ripple Clock Output (Active LOW)	20/10	10/5.0 (2.5)
TC	Terminal Count Output (Active HIGH)	20/10	10/5.0 (2.5)

For K11 questions

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INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

PIN NAMES	DESCRIPTION	54/74 (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
$\overline{CE}$	Count Enable Input (Active LOW)	3.0/3.0	1.5/0.75
CP	Clock Pulse Input (Active Rising Edge)	1.0/1.0	0.5/0.25
$P_0 - P_3$	Parallel Data Inputs	1.0/1.0	0.5/0.25
$\overline{PL}$	Asynchronous Parallel Load Input (Active LOW)	1.0/1.0	0.5/0.25
$\overline{U}/D$	Up/Down Count Control Input	1.0/1.0	0.5/0.25
$Q_0 - Q_3$	Flip-flop Outputs	20/10	10/5.0 (2.5)
$\overline{RC}$	Ripple Clock Output (Active LOW)	20/10	10/5.0 (2.5)
TC	Terminal Count Output (Active HIGH)	20/10	10/5.0 (2.5)

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TRUTH TABLE

INPUTS					OUTPUT
MR	CP	$\overline{IE}_1$	$\overline{IE}_2$	D_n	Q_n
H	X	X	X	X	L
L	L	X	X	X	Q_n
L	↑	H	X	X	Q_n
L	↑	X	H	X	Q_n
L	↑	L	L	L	L
L	↑	L	L	H	H

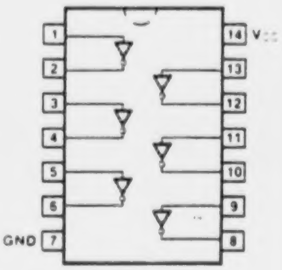
When either $\overline{OE}_1$ or $\overline{OE}_2$ are HIGH, the output is in the OFF state (high impedenace), however this does not affect the contents or sequential operating of the register

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

04

CONNECTION DIAGRAMS

PINOUT A



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AC OPERATING REQUIREMENTS: $V_{CC} = +5.0$ V, $T_A = +25°C$

SYMBOL	PARAMETER	54/74		54/74S		54/74LS		UNITS	CONDITIONS
		Min	Max	Min	Max	Min	Max		
t_s (H) t_s (L)	Setup Time HIGH or LOW D_n to CP	20 20		5.0 5.0		10 10		ns	Fig. 3-6
t_h (H) t_h (L)	Hold Time HIGH or LOW D_n to CP	5.0 5.0		3.0 3.0		5.0 5.0		ns	
t_w (H)	CP Pulse Width HIGH	20		7.0		18		ns	Fig. 3-8
t_w (L)	$\overline{MR}$ Pulse Width LOW	20		7.0		18		ns	Fig. 3-16
t_{rec}	Recovery Time $\overline{MR}$ to CP	25		5.0		12		ns	

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
3	Letter of correct answer	7	Writer(s)/reviewer(s)
	Source (author, year of publication)	8	Accompanying artwork (ART)

....

1. | A1 | a | IML Mod. 1 | 0890 | C | R.M. |

There are four classes types of fires.

a. True

b. False

....

2. | A1 | d | IML Mod. 1 | 0890 | C | R.M.|

On which type of fire should a Class D fire extinguisher be used?

a. Wood

b. Flammable liquids

c. Electrical

d. Combustible metals

....

3. | A1 | b | IML Mod. 1 | 0890 | C | R.M. |

On which type of fire should a Class A fire extinguisher be used?

a. Electrical

b. Wood

c. Grease

d. Combustible metal

....
4. | A1 | a | IML Mod. 1 | 0890 | C | R.M. |

On which type of fire should a Class C fire extinguisher be used?

a. Electrical

b. Gasoline

c. Oil

d. Metal

....

5. | A2 | d | IML Mod. 1 | 0890 | C | R.M. |

What is an outlet with many cables attached to it called?

a. Switched outlet

b. Six-way outlet

c. Ground-fault interrupt outlet

d. Octopus outlet

....

6. | A2 | b | IML Mod. 1 | 0890 | C | R.M. |

Current is usually considered less serious than voltage.

a. True

b. False

....

7. | A2 | b | IML Mod. 1 | 0890 | C | R.M. |

At about what level of current will a slight shock be felt?

a. .1 mA

b. 1 mA

c. 10 mA

d. 15 mA

....

8. | A2 | c | IML Mod. 1 | 0890 | C | R.M. |

What is the correct procedure for removing a victim of electrical shock from a source of electricity?

a. Grab and quickly pull him or her away from the source.

b. Use your feet to kick the victim away from the source.

c. Use a nonconductive item to separate the victim and source.

d. Call 911.

....
9. | A3 | b | IML Mod. 1 | 0890 | C | R.M. |

Solvents can be safely used and stored in any environment.

a. True

b. False

....
10. | A3 | a | IML Mod. 1 | 0890 | C | R.M. |

All equipment and tools showing signs of wear should be reported to the supervisor immediately.

a. True

b. False

....
11. | A3 | d | IML Mod. 1 | 0890 | C | R.M. |

What is the proper lab/shop procedure for leaving test equipment or circuits being worked on?

a. Cover the items so dust won't build up on them.

b. Instruct others to leave your work site undisturbed.

c. Leave a reference point so as to begin where you left off.

d. Turn off all power before leaving test equipment.

....
12. | A3 | b | IML Mod. 1 | 0890 | C | R.M. |

The third prong of a three-prong plug may be removed if only two-hole outlet plugs are available.

a. True

b. False

....
13. | A4 | b | IML Mod. 4 | 0890 | C | R.M. |

Which soldering tool would be used to make a large electrical connection safely when heat control is required?

a. 70 watt iron

b. 100-250 watt gun

c. 150 watt iron

d. 200 watt iron

....
14. | A4 | c | IML Mod. 4 | 0890 | C | R.M. |

Which must be done to make a solder connection safely without burning the printed circuit board or destroying a component?

a. Spray coolant on the device while soldering.

b. Turn the soldering iron down to prevent damage.

c. Use a heat sink to draw heat away from the board or device.

d. Apply the iron intermittently to the device being soldered.

....
15. | A4 | b | IML Mod. 4 | 0890 | C | R.M. |

To remove excess solder from the iron, give it a quick flip in a direction where no one is standing.

a. True

b. False

....
16. | A4 | b | IML Mod. 4 | 0990 | C | R.M. |

A soldering iron properly placed in its holder is considered completely safe.

a. True

b. False

....
17. | A5 | a | IML Mod. 1 | 0890 | C | R.M. |

What factor should be considered when purchasing a hand tool?

a. Knowledge of specifications

b. Cost of the tool in comparison to profit of the job

c. Proper tool use

d. Ability of operator to use the tool

....
18. | A5 | a | IML Mod. 1 | 0890 | C | R.M. |

Tools should be specifically designed for electronics use.

a. True

b. False

....
19. | A5 | b | IML Mod. 1 | 0890 | C | R.M. |

What function can combination slip-joint pliers perform safely?

a. Cutting cable

b. Holding and turning

c. Stripping wire

d. Crimping solderless connections

....
20. | A5 | c | IML Mod. 1 | 0890 | C | R.M.|

What function can long-nose pliers perform safely?

a. Tightening and loosening nuts

b. Cutting wire

c. Heat sinking

d. Stripping insulation

....

21. | A6 | a | IML Mod. 1 | 0890 | C | R.M. |

The hazard of microwave exposure depends upon frequency, power and signal exposure duration.

a. True

b. False

....

22. | A6 | d | IML Mod. 1 | 0890 | C | R.M. |

What symptom can result from excessive exposure to RF radiation?

a. High blood pressure

b. Headaches

c. Rashes

d. Blindness

....

23. | A6 | a | IML Mod. 1 | 0890 | C | R.M. |

What precaution should be taken with microwave equipment?

a. Do not operate equipment without proper shielding in place.

b. Always wear a microwave detection meter.

c. Wear protective glasses that filter out microwaves.

d. Check microwave power levels and keep at a minimum.

....

24. | A6 | a | IML Mod. 1 | 0890 | C | R.M. |

Just as for visible light, laser absorption by the human body is selective.

a. True

b. False

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
3	Letter of correct answer	7	Writer(s)/reviewer(s)
	Source (author, year of publication)	8	Accompanying artwork (ART)

....

1. | B1 | a | Floyd E.C. | 0890 | C | R.M. |

What is the outermost shell of an atom called?

a. Valence

b. Current

c. Proton

d. Neutron

....

2. | B1 | b | Floyd E.C. | 0890 | C | R.M. |

How much charge does one coulomb have?

a. 6.25 x 10^{10} (or 6.25 E 10 electrons)

b. 6.25 x 10^{18} (or 6.25 E 18 electrons)

c. 6.25 x 10^{25} (or 6.25 E 25 electrons)

d. 6.25 x 10^{28} (or 6.25 E 28 electrons)

....

3. | B1 | c | Floyd E.C. | 0890 | C | R.M. |

A single electron has how much charge in coulombs?

a. 1.6 x 10^{-10} (or 1.6 E -10)

b. 1.6 x 10^{-15} (or 1.6 E -15)

c. 1.6 x 10^{-19} (or 1.6 E -19)

d. 1.6 x 10^{-25} (or 1.6 E -25)

. . . .
4. | B1 | a | Floyd E.C. | 0890 | C | R.M. |

The charge of an electron is negative.

a. True

b. False

....
5. | B2 | a | Malvino | 0890 | C | R.M. |

What is the most common type of semiconductor in use?

a. Silicon

b. Germanium

c. Quartz

d. Gallium arsenide

....
6. | B2 | b | Malvino | 0890 | C | R.M. |

What is the merging of a free electron and a hole called?

a. Reconstitution

b. Recombination

c. Relevant bonding

d. Relational excitation

....
7. | B2 | c | Malvino | 0890 | C | R.M. |

What change occurs when a semiconductor is doped (as compared to pure silicon)?

a. Decreased conductivity

b. Removes pentavalent atoms

c. Increased conductivity

d. Forms a crystalline lattice

....

8. | B2 | d | Malvino | 0890 | C | R.M. |

What is the area in a diode called where positive and negative regions meet?

a. Barrier potential

b. Barrier gap

c. Unbiased zone

d. Depletion region

....

9. | B3 | a | Floyd E.C. | 0890 | C | R.M. |

What is the group of lines surrounding a magnet called?

a. Magnetic flux

b. Magnetic attraction

c. Magnetic repulsion

d. Magnetic induction

....

10. | B3 | b | Floyd E.C. | 0890 | C | R.M. |

In an electromagnetic circuit, what is the opposition to the ability to establish a magnetic field called?

a. Magnetomotive force

b. Reluctance

c. Permeability

d. Magnetic charge

....

11. | B3 | c | Floyd E.C. | 0890 | C | R.M. |

"The direction of the current induced in a coil is always such that it opposes the change in the magnetic field that produced it." Who discovered this law?

a. Faraday

b. Geissler

c. Lenz

d. Maxwell

....
12. | B3 | d | Floyd E.C. | 0890 | C | R.M. |

What is the ability of a coil to establish an induced voltage as a result of a change in its current called?

a. Mutual inductance

b. Apparent inductance

c. Pulsing inductance

d. Self inductance

....

13. | B4 | a | Floyd E.C. | 0890 | C | R.M. |

What does current flowing through a conductor produce?

a. Electromagnetic field

b. Magnetomotive force

c. Electro-reluctant force

d. Electro-permeable field

....

14. | B4 | b | Floyd E.C. | 0890 | C | R.M. |

When nonmagnetic material is placed in a magnetic field, the lines of force will be altered.

a. True

b. False

....

15. | B4 | a | Floyd E.C. | 0890 | C | R.M. |

Like poles of a magnet repel; unlike poles attract.

a. True

b. False

....

16. | B4 | c | Floyd E.C. | 0890 | C | R.M. |

How many time constants does it take to fully charge an inductor in a DC circuit?

a. 1

b. 3

c. 5

d. 7

....
17. | B5 | a | Frenzel | 0890 | C | R.M. |

What name is given to electromagnetic signals above 300 GHz?

a. Infrared

b. Microwave

c. HF

d. RF

....
18. | B5 | a | Frenzel | 0890 | C | R.M. |

When used as a sensor, a light-sensitive device uses the photoelectric effect.

a. True

b. False

....
19. | B5 | c | Frenzel | 0890 | C | R.M. |

What is the name of a discrete device that amplifies current in relationship to the amount of light striking the receiver?

a. Photoresistor

b. Photodiode

c. Phototransistor

d. Photocapacitor

....
20. | B5 | a | Frenzel | 0890 | C | R.M. |

Light travels at the speed of 186,000 miles per second.

a. True

b. False

....

21. | B6 | a | Floyd E.C. | 0890 | C | R.M. |

A device that converts thermal energy to electrical energy takes advantage of the thermocouple effect.

a. True

b. False

....

22. | B6 | D | Floyd E.C. | 0890 | C | R.M. |

When the temperature increases, what happens to the resistance in a conductor with a negative temperature coefficient?

a. Increases

b. Alternates up and down

c. Remains the same

d. Decreases

....
23. | B7 | a | Conceptual Physics | 0890 | C | R.M. |

What is a charged atom called?

a. Ion

b. Proton

c. Neutron

d. Electron

....
24. | B7 | b | Conceptual Physics | 0890 | C | R.M. |

What is the study of electricity at rest called?

a. Electrophysics

b. Electrostatics

c. Electronics

d. Electrolytics

....
25. | B7 | a | Conceptual Physics | 0890 | C | R.M. |

According to Coulomb's law, the electrical force between two charged objects is proportional to the product of the charges and inversely proportional to the square of the distance between them.

a. True

b. False

....
26. | B7 | b | Conceptual Physics | 0890 | C | R.M. |

The nucleus of an atom is composed of electrons and protons.

a. True

b. False

....

27. | B8 | a | Floyd E.C. | 0890 | C | R.M. |

If resistance is held constant and voltage is increased, what happens to current?

a. Increases

b. Decreases

c. Stays the same

....

28. | B8 | b | Floyd E.C. | 0890 | C | R.M. |

If a circuit has a power source of 27 volts and a total resistance of 63 ohms, what is total current?

a. 428 microamps

b. 428 milliamps

c. 428 picoamps

d. 428 nanoamps

....

29. | B8 | c | Floyd E.C. | 0890 | C | R.M. |

If a circuit has a resistance of 70 kilohms and total current of .9 milliamps, what is the power source?

a. .63 volts

b. 6.3 volts

c. 63 volts

d. 630 volts

. . . .
30. | B8 | d | Floyd E.C. | 0890 | C | R.M. |

If a circuit has a power source of 88 volts and current of 2.3 amps, how much total resistance does the circuit contain?

a. 38.26 kilohms

b. 3.826 kilohms

c. 382.6 ohms

d. 38.26 ohms

....

31. | B9 | c | Floyd E.C. | 0890 | C | R.M. |

How many time constants does it take to fully charge a capacitor in a DC circuit?

a. 1

b. 3

c. 5

d. 7

....

32. | B9 | a | Floyd E.C. | 0890 | C | R.M. |

When fully charged, a capacitor blocks current in a DC circuit.

a. True

b. False

....

33. | B9 | a | Floyd E.C. | 0890 | C | R.M. |

In a capacitor, by how many degrees does current lead voltage?

a. 90

b. 180

c. 270

d. 360

....

34. | B9 | a | Floyd E.C. | 0890 | C | R.M. |

Ideally, the average power of a capacitor is always zero.

a. True

b. False

....
35. | B10 | a | E&E | 0890 | C | P.M. |

By how many degrees does the alternating voltage lead the current in a pure inductive current?

a. 90

b. 100

c. 120

d. 180

....
36. | B10 | d | E&E | 0890 | C | P.M. |

What is the base unit of measurement for inductance?

a. Ohm

b. Ampere

c. Farad

d. Henry

....
37. | B10 | b | E&E | 0890 | C | P.M. |

Inductance opposes any change in voltage.

a. True

b. False

....
38. | B10 | b | E&E | 0890 | C | P.M. |

Which describes the counter EMF induced in a coil that opposes a change in current?

a. Mutual induction

b. Self induction

c. Flyback effect

d. Transient response

....

39. | B11 | a | E&E | 0890 | C | P.M. |

What is the formula to find the reactance of an inductor?

a. $X_L = 2\pi FL$

b. $X_L = 2\pi V$

c. $L = V / I$

d. $L = L_1 + L_2$, etc.

....

40. | B11 | c | E&E | 0890 | C | P.M. |

What is the reactance of a four-Henry coil at 100 Hertz?

a. 1,512 ohms

b. 2,025 ohms

c. 2,512 ohms

d. 3,515 ohms

....

41. | B11 | d | E&E | 0890 | C | P.M. |

What is the unit of measurement for inductive reactance?

a. Hertz

b. Voltage

c. Ampere

d. Ohm

....
42. | B11 | c | E&E | 0890 | C | P.M. |

What formula is used to find the amount of mutual inductance between two coils?

a. $X_L = 2\pi FL$

b. $L_T = L_1 + L_2$

c. $M = K\sqrt{L_1 + L_2}$

d. $M = \sqrt{2\pi FL}$

....
43. | B11 | c | Crowder College | 0890 | C | B.C. |

What is the capacitive reactance if the capacitor voltage is 125 volts AC and the capacitor current is 0.7 amps AC?

a. 0.0056 ohm

b. 87.5 ohm

c. 179 ohm

d. 508 ohm

e. 875 ohm

....
44. | B11 | e | Crowder College | 0890 | C | B.C. |

What is the applied frequency to a series RL circuit when $X_L = 100$ ohms, $L = 0.025$ henry, and $R = 1,200$ ohms?

a. 0.00636 Hertz

b. 0.0637 Hertz

c. 6.37 Hertz

d. 63.7 Hertz

e. 637 Hertz

....
45. | B11 | d | Crowder College | 0890 | C | B.C. |

What is the frequency of a waveform that has a period of 0.279 microseconds?

a. 3.58 KHz

b. 35.8 KHz

c. 358 KHz

d. 3.58 MHz

e. Depends on the applied voltage

....
46. | B11 | b | Crowder College | 0890 | C | B.C. |

Calculate the inductive reactance of a 15 mH coil at 500 Hertz (cycles per second).

a. 0.021 ohms

b. 47 ohms

c. 210 ohms

d. 471 ohms

e. 680 ohms

....
47. | B11 | d | Crowder College | 0890 | C | B.C. |

What is the capacitive reactance when C = 330 microfarad and frequency is 60 Hz?

a. 0.008 ohms

b. 0.124 ohms

c. 0.995 ohms

d. 8 ohms

e. 124 ohms

....

48. | B11 | c | Crowder College | 0890 | C | B.C. |

What is the inductive reactance when L = 20 millihenrys and frequency is 60 Hz?

a. 0.133 ohms

b. 0.754 ohms

c. 7.54 ohms

d. 133 ohms

e. 1,200 ohms

....

49. | B12 | a | E&E | 0890 | C | P.M. |

What is the color code for a 2.2 ohm resistor?

a. Red, red, gold

b. Red, red, black

c. Red, black, black

d. Orange, brown, red

....

50. | B12 | b | E&E | 0890 | C | P.M. |

In a four-band resistor, what does the fourth color-code band represent?

a. Multiplier

b. Tolerance

c. First digit

d. Reliability level

....

51. | B12 | c | E&E | 0890 | C | P.M. |

What is the resistance of a 20-ohm and a 40-ohm resistor connected in series?

a. 13.3 ohms

b. 20 ohms

c. 60 ohms

d. 80 ohms

. . . .
52. | B12 | a | E&E | 0890 | C | P.M. |

What is the equivalent resistance of a circuit with a 20-ohm and 60-ohm resistor connected in parallel?

a. 15 ohms

b. 20 ohms

c. 60 ohms

d. 80 ohms

....
53. | B13 | d | E&E | 0890 | C | P.M. |

What component in a circuit opposes a change in voltage?

a. Diode

b. Resistor

c. Inductor

d. Capacitor

....
54. | B13 | a | E&E | 0890 | C | P.M. |

What is the insulator called between the two plates of a capacitor?

a. Dielectric

b. Conductor

c. Stator

d. Buffer

....
55. | B13 | b | E&E | 0890 | C | P.M. |

What formula is used to calculate the capacitance of capacitors in parallel?

a. $C_T = \frac{C_1 \times C_2}{C_1 \times C_2}$

b. $C_T = C_1 + C_2 + C_3$, etc.

c. $C_T = C_1 \times C_2 \times C_3$, etc.

d. $C_T = \sqrt{C_1 + C_2}$

....
56. | B13 | c | E&E | 0890 | C | P.M. |

What determines the capacitance of a capacitor?

a. Voltage applied

b. Current applied

c. Area of the plates

d. Leads of the capacitor

....
57. | B14 | d | E&E | 0890 | C | P.M. |

What does the inductance of a coil oppose in an electrical circuit?

a. Voltage

b. Wattage

c. Resistance

d. Current

....
58. | B14 | b | E&E | 0890 | C | P.M. |

What is measured when testing an inductor with an ohmmeter?

a. Inductance

b. Resistance

c. Frequency

d. Wattage

....
59. | B14 | d | E&E | 0890 | C | P.M. |

What is the formula to calculate the time constant of an RL circuit?

a. T = RL

b. L = RT

c. T - R / L

d. T = L / R

....

60. | B14 | c | E&E | 0890 | C | P.M. |

What is the unit of measurement for inductance?

a. Ampere

b. Volt

c. Henry

d. Farad

....
61. | B15 | c | E&E | 0890 | C | P.M. |

What is a parallel resonant circuit called?

a. Acceptor circuit

b. Capacitive circuit

c. Tank circuit

d. Resistive circuit

....
62. | B15 | c | E&E | 0890 | C | P.M. |

What is the total impedance of a series resonant circuit if R = 200 ohms, X_C = 400 ohms and X_L = 600 ohms?

a. 400 ohms

b. 382.8 ohms

c. 282.8 ohms

d. 182.4 ohms

....
63. | B15 | c | E&E | 0890 | C | P.M. |

What is the total current in a parallel RCL circuit if R = 20 ohms, X_C = 80 ohms, X_L = 40 ohms with 40 volts applied?

a. 3.5 amperes

b. 2.5 amperes

c. 2.06 amperes

d. .5 amperes

....

64. | B15 | b | E&E | 0890 | C | P.M. |

What is the formula for calculating resonance frequency of a tank circuit?

a. $Z = \sqrt{R^2 (X_L - X_C)^2}$

b. $f_r = 1 / 2\pi\sqrt{LC}$

c. $BW = f_r / Q$

d. $Q = XL / R$

....

65. | B15 | b | Crowder College | 0890 | C | B.C. |

A series RCL circuit has the following values: C = 120 microfarads, L = 15 millihenrys, R = 0.01 ohms. What is the resonant frequency?

a. 11.1 Hertz

b. 119 Hertz

c. 890 Hertz

d. 11,900 Hertz

e. 89,900 Hertz

....

66. | B15 | b | Crowder College | 0890 | C | B.C. |

A series RCL circuit has the following values: C = 47 picofarads, L = 22 microhenrys and R = 0.5 ohms. What is the resonant frequency?

a. 1.97 MHz

b. 4.95 MHz

c. 12.4 MHz

d. 80.6 MHz

e. 202 MHz

....
67. | B15 | d | Crowder College | 0890 | C | B.C. |

If the bandwidth of a circuit is 140 KHz and the resonant frequency is 10 MHz, what is the lower half-power frequency?

a. 4,930 KHz

b. 5,000 KHz

c. 5,070 KHz

d. 9,930 KHz

e. 9,860 KHz

....

68. | B16 | b | E&E | 0890 | C | P.M. |

When measuring resistance in a circuit, what must be done?

a. Check for leakage.

b. Turn off power.

c. Make sure the meter is grounded.

d. Stand on insulating pad.

....

69. | B16 | c | E&E | 0890 | C | P.M. |

When soldering replacement transistors on a circuit board, what must be done?

a. Observe voltage

b. Test bias voltage

c. Use heat sink

d. Use a current meter

....

70. | B16 | d | E&E | 0890 | C | P.M. |

When replacing electrolytic capacitors, what must be checked?

a. Static electricity

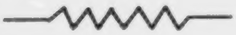
b. Leakage current

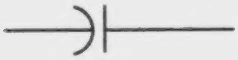
c. Temperature coefficient

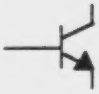
d. Polarity

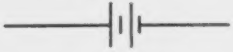
....
| B17 | 71-c, 72-e, 73-ab, 74-b | E&E | 0890 |
C | P.M. | ART

Match each of the symbols with its definition.

71. 

72. 

73. 

74. 

a. Inductor

b. Battery

c. Resistor

d. Connector

e. Capacitor

ab. Transistor

....
75. | B17 | b | E&E | 0890 | C | P.M. |

Symbols for transformers indicate whether the core is a magnetic or nonmagnetic material.

a. True

b. False

....
76. | B17 | a | E&E | 0890 | C | P.M. | ART

What is the symbol shown in Figure B17.1?

a. P-channel MOSFET

b. NPN transistor

c. N-channel FET

d. NAND gate

....

77. | B17 | b | E&E | 0890 | C | P.M. | ART

What is the symbol shown in Figure B17.2?

a. NOR gate

b. NAND gate

c. AND gate

d. OR gate

....
78. | B18 | c | E&E | 0890 | C | P.M. |

What is the RC time constant of a 500 microfarad capacitor and 2500-ohm resistor?

a. 125 sec.

b. 12.5 sec.

c. 1.25 sec.

d. .125 sec.

....
79. | B18 | b | E&E | 0890 | C | P.M. |

What is the RC time constant of a 225 microfarad capacitor and 3200-ohm resistor?

a. .072 sec.

b. .72 sec.

c. .816 sec.

d. 7.2 sec.

....
80. | B18 | a | E&E | 0890 | C | P.M. |

What is the RC time constant of a 2K ohm resistor and .2 microfarad capacitor?

a. .4 ms

b. .004 sec.

c. .04 sec.

d. 4 sec.

....
81. | B18 | c | E&E | 0890 | C | P.M. |

What is the RC time constant of a 67 microfarad capacitor and 180-ohm resistor after five time constants?

a. 600 ms

b. 120 ms

c. 60 ms

d. 12 ms

....
82. | B19 | a | E&E | 0890 | C | P.M. |

What is a common type of filter used in a low-voltage power supply?

a. Band-pass

b. High-pass

c. T-type

d. Low-pass

....
83. | B19 | b | E&E | 0890 | C | P.M. | ART

What type of filter is shown in Figure B19.1?

a. High-pass

b. Low-pass

c. T-type

d. Pi-type

....
84. | B19 | c | E&E | 0890 | C | P.M. |

What type of filter would be used for a car radio to block out motor noise on 12 volts input?

a. High-pass

b. T-type

c. Low-pass

d. Band reject

....

85. | B19 | d | E&E | 0890 | C | P.M. |

What type of filter network is used to improve selectivity of an FM radio receiver?

a. High-pass

b. Pi-type

c. Band reject

d. Band-pass

....
86. | B20 | d | E&E | 0890 | C | P.M. |

What type of test equipment is used to test a filter in a radio?

a. Ammeter

b. Wattmeter

c. Frequency counter

d. Signal generator

....
87. | B20 | a | E&E | 0890 | C | P.M. |

An oscilloscope can be used to test the performance of a band reject filter.

a. True

b. False

....
88. | B20 | b | E&E | 0890 | C | P.M. |

What type of signal is used as an input for a 4.5 megahertz bandpass filter?

a. Audio

b. RF

c. FM

d. Modulated carrier

....
89. | B20 | c | E&E ¦ 0890 | C | P.M. |

At what point on the slope of a signal is the half-power point measured?

a. Zero

b. .637 x peak

c. .707 x peak

d. 90 degrees on slope

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
3	Letter of correct answer	7	Writer(s)/reviewer(s)
	Source (author, year of publication)	8	Accompanying artwork (ART)

....

1. | C1 | c | E&E | 0890 | C | D.W. |

What type of core does the power transformer require?

a. Air

b. Powdered iron

c. Laminated iron

d. Laminated steel

....

2. | C1 | d | E&E | 0890 | C | D.W. |

What type of transformer has a secondary voltage larger than the primary voltage?

a. Auto

b. Step-down

c. Isolation

d. Step-up

....

3. | C1 | a | E&E | 0890 | C | D.W. |

What type of transformer uses the same winding as the primary and secondary?

a. Auto

b. Step-down

c. Isolation

d. Step-up

....
4. | C1 | a | E&E | 0890 | C | D.W. |

In a step-up transformer, the voltage in the primary is less than in the secondary.

a. True

b. False

66

....
5. | C2 | b | E&E | 0890 | C | D.W. |

What is the current requirement of the secondary of a 12 volt transformer at 48 watts?

a. 2

b. 4

c. 50

d. 570

....
6. | C2 | c | E&E | 0890 | C | D.W. |

What turns ratio in a transformer is required to produce 6 volts from a 120-volt line?

a. 2:1

b. 10:1

c. 20:1

d. 40:1

....
7. | C2 | a | E&E | 0890 | C | D.W. |

When used within specifications, the winding of a step-up transformer designated as the primary can be used as the secondary.

a. True

b. False

....

8. | C2 | a | E&E | 0890 | C | D.W. |

What is the primary current of a 12 volt, 12 watt transformer?

a. 100 milliamperes

b. 1 ampere

c. 2 amperes

d. 4 amperes

....
9. | C3 | c | E&E | 0890 | C | D.W. |

What is the PIV requirement of a diode used with 12 volts RMS?

a. 12 volts

b. 20 volts

c. 34 volts

d. 40 volts

....
10. | C3 | d | E&E | 0890 | C | D.W. |

What determines the PIV requirement of a diode in a power supply?

a. Input voltage

b. Input current

c. Input wattage

d. RMS voltage across the diode

....
11. | C3 | d | E&E | 0890 | C | D.W. |

What is the purpose of connecting diodes in series in a power supply?

a. Increase the ripple frequency

b. Increase the output current

c. Increase the output voltage

d. Increase the PIV rating of the rectifier

....

12. | C3 | d | E&E | 0890 | C | D.W. |

What is the ripple frequency of a bridge rectifier output voltage if the input frequency is 60 Hz?

a. 30

b. 60

c. 80

d. 120

....
13. | C4 | a | E&E | 0890 | C | D.W. |

What is the purpose of a capacitor in parallel with a diode in a power supply?

a. Protect the diode

b. Increase the output voltage

c. Protect the filter capacitor

d. Regulate the output voltage

....
14. | C4 | a | E&E | 0890 | C | D.W. |

Why are electrolytic capacitors used in power supplies?

a. Provide a large amount of capacitance in a small space

b. Provide very low working voltage rating

c. Obtain a higher voltage output

d. Increase ripple frequency of the output voltage

....
15. | C4 | d | E&E | 0890 | C | D.W. |

What is the purpose of a bleeder resistor in a power supply?

a. Protect the diode

b. Increase the output voltage

c. Improve current regulation

d. Discharge the filter capacitor

....
16. | C4 | c | E&E | 0890 | C | D.W. |

What component is used as the reference voltage in a regulated power supply?

a. Resistor

b. Transistor

c. Zener diode

d. Capacitor

72

....

17. | C5 | b | E&E | 0890 | C | D.W. |

What component is used as the voltage divider in a series regulator?

a. Resistor

b. Transistor

c. Zener diode

d. Capacitor

....

18. | C5 | a | E&E | 0890 | C | D.W. |

What component is used to adjust the output voltage in a series regulated power supply?

a. Resistor

b. Transistor

c. Zener diode

d. Capacitor

....

19. | C5 | b | E&E | 0890 | C | D.W. |

A series regulator is more accurate than a shunt regulator.

a. True

b. False

....
20. | C5 | d | E&E | 0890 | C | D.W. |

What voltage zener diode would be used to produce an output of 12 volts in a series regulator?

a. 2

b. 6.3

c. 11.3

d. 12.7

....
21. | C6 | a | E&E | 0890 | C | D.W. |

What component is used as the voltage divider in a shunt regulator?

a. Resistor

b. Transistor

c. Zener diode

d. Capacitor

....
22. | C6 | a | E&E | 0890 | C | D.W. |

What component is used to adjust the output voltage in a shunt regulated power supply?

a. Resistor

b. Transistor

c. Zener diode

d. Capacitor

....
23. | C6 | b | E&E | 0890 | C | D.W. |

A shunt regulator is more efficient than a series regulator.

a. True

b. False

....
24. | C6 | b | E&E | 0890 | C | D.W. |

What voltage zener diode would be used to produce a output of 12 volts in a shunt regulator?

a. 2

b. 11.3

c. 12

d. 12.7

....

25. | C7 | d | E&E | 0890 | C | D.W. |

What part is used as the voltage divider in a switching regulator?

a. Resistor

b. Transistor

c. Zener diode

d. None

....

26. | C7 | b | E&E | 0890 | C | D.W. |

What component is used to control the output voltage in a switching regulated power supply?

a. Resistor

b. Transistor

c. Zener diode

d. Capacitor

....

27. | C7 | a | E&E | 0890 | C | D.W. |

A switching regulated power supply uses a feedback loop.

a. True

b. False

....

28. | C7 | b | E&E | 0890 | C | D.W. |

What is the advantage of a switching regulated power supply?

a. Size

b. Accuracy

c. Cost

d. Ease of repair

....

29. | C8 | d | E&E | 0890 | C | D.W. |

Which is correct when changing a rectifier diode?

a. Use a signal diode.

b. Replace with a resistor.

c. Increase the PIV.

d. Observe polarity.

....

30. | C8 | c | E&E | 0890 | C | D.W. |

What must be done before changing components in a power supply?

a. Test replacement parts.

b. Disconnect the transformer.

c. Discharge the capacitor.

d. Remove the diodes.

....

31. | C8 | a | E&E | 0890 | C | D.W. |

When an electrolytic capacitor in a power supply is replaced, polarity must be observed.

a. True

b. False

....

32. | C8 | b | E&E | 0890 | C | D.W. |

Which statement is true?

a. Replace component with lower values.

b. Replace component with the same value or higher voltage rating.

c. Replace component with the same value or lower voltage rating.

d. Replace component with lower current rating.

....
33. | C9 | b | E&E | 0890 | C | D.W. |

What type of voltage should be measured at the output filter network of a power supply?

a. AC

b. DC

c. Pulsing DC

d. Square wave

....
34. | C9 | d | E&E | 0890 | C | D.W. |

What would the output voltage be if one of the diodes were to open in a full-wave power supply?

a. One-fourth of the supply voltage

b. One-half of the supply voltage

c. Three-fourths of the supply voltage

d. Full supply voltage

....
35. | C9 | a | E&E | 0890 | C | D.W. |

Which type of power supply has an output identical to the output of a full-wave power supply with one diode open?

a. Half-wave

b. Full-wave

c. Full-wave bridge

d. Switching

....
36. | C9 | c | E&E | 0890 | C | D.W. |

In a positive half-wave power supply, what type of voltage will be measured at the cathode of a power supply diode?

a. AC

b. DC

c. Pulse DC

d. None

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
3	Letter of correct answer	7	Writer(s)/reviewer(s)
	Source (author, year of publication)	8	Accompanying artwork (ART)

....

1. | D1 | a | Floyd E.D. | 0890 | C | R.B. | ART

In Figure D1.1, which is a schematic diagram for a PN-junction diode?

a. b. c. d.

....

2. | D1 | b | Floyd E.D. | 0890 | C | R.B. | ART

In Figure D1.2, which is a schematic diagram for an NPN-bipolar transistor?

a. b. c. d.

....

3. | D1 | d | Floyd E.D. | 0890 | C | R.B. | ART

In Figure D1.3, which is a schematic diagram for an N-channel enhancement MOSFET?

a. b. c. d.

....

4. | D1 | c | Floyd E.D. | 0890 | C | R.B. | ART

In Figure D1.4, which is a schematic diagram for a silicon-controlled rectifier (SCR)?

a. b. c. d.

....

5. | D2 | c | Floyd E.D. | 0890 | C | R.B. |

What is the approximate voltage across a forward-biased silicon diode after conduction occurs?

a. .1V

b. .4V

c. .7V

d. 1.0V

....

6. | D2 | a | Floyd E.D. | 0890 | C | R.B. |

The depletion region of a reverse-biased PN-junction diode increases as the voltage increases.

a. True

b. False

....

7. | D2 | c | Malvino | 0890 | C | R.B. |

Which diode approximation includes the barrier potential voltage and the bulk resistance of the device?

a. First

b. Second

c. Third

d. None of the above

....
8. | D2 | b | Malvino | 0890 | C | R.B. | ART

Refer to Figure 2.1. Using the second approximation, what is the voltage across the silicon diode?

a. .3V

b. .7V

c. 5V

d. 10V

....

9. | D3 | a | Floyd E.D. | 0890 | C | R.B. |

How is the base-emitter junction of a bipolar transistor biased in order to properly operate as an amplifier?

a. Forward biased

b. Reverse biased

c. Zero biased

d. None of the above

....

10. | D3 | b | Floyd E.D. | 0890 | C | R.B. |

What is the ratio of collector current to base current in a bipolar junction transistor called?

a. Alpha

b. Beta

c. Efficiency

d. Q factor

....

11. | D3 | a | Floyd E.D. | 0890 | C | R.B. |

What is the ratio of collector current to emitter current in a bipolar junction transistor called?

a. Alpha

b. Beta

c. Efficiency

d. Q factor

....

12. | D3 | b | Floyd E.D. | 0890 | C | R.B. |

What is the state called when the collector current of a BJT has reached a maximum value and is independent of the base current?

a. Inversion

b. Saturation

c. Cutoff

d. Breakdown

....

13. | D4 | a | Malvino | 0890 | C | R.B. | ART

In Figure D4.1, what is the primary function of the circuit?

a. Switch

b. Current source

c. Oscillator

d. Amplifier

....

14. | D4 | c | Malvino | 0890 | C | R.B. | ART

In Figure D4.2, which biasing technique is classified as voltage divider biasing?

a. b. c. d.

....

15. | D4 | c | Malvino | 0890 | C | R.B. |

When calculating the saturation point of a transistor during the development of a load line, how is the transistor viewed?

a. As an open circuit

b. As a resistive circuit

c. As a short circuit

d. None of the above

....

16. | D4 | a | Floyd E.D. | 0890 | C | R.B. |

Which bipolar biasing technique is most widely used in order to maintain a stable operating point using only one power supply?

a. Voltage divider bias

b. Emitter bias

c. Base bias

d. Collector feedback bias

....

17. | D5 | b | Floyd E.D. | 0890 | C | R.B. |

What is the correct gate-source biasing technique used for proper JFET operation?

a. Forward bias

b. Reverse bias

c. Base bias

d. Feedback bias

....

18. | D5 | c | Floyd E.D. | 0890 | C | R.B. |

Which voltage applied to a JFET controls the drain current (I_D) through the device?

a. Source

b. Drain

c. Gate

d. Channel

....

19. | D5 | c | Floyd E.D. | 0890 | C | R.B. |

When the gate-source voltage (V_{GS}) of an N-channel JFET is equal to zero volts, what is the drain current?

a. Zero

b. Minimum

c. Maximum

d. Does not change

....

20. | D5 | c | Floyd E.D. | 0890 | C | R.B. |

What is the approximate input impedance of a JFET?

a. Zero ohms

b. Low ohms

c. High ohms

d. Infinite ohms

....

21. | D6 | b | Floyd E.D. | 0890 | C | R.B. |

A MOSFET is a current-controlled device.

a. True

b. False

....

22. | D6 | b | Floyd E.D. | 0890 | C | R.B. | ART

In Figure D6.1, which characteristic curve represents a DE-MOSFET?

a. b. c. d.

....

23. | D6 | b | Floyd E.D. | 0890 | C | R.B. |

Which term is used for the minimum voltage required for conduction in an E-MOSFET?

a. Channel voltage

b. Threshold voltage

c. Source voltage

d. Drain voltage

....

24. | D6 | d | Floyd E.D. | 0890 | C | R.B. |

Which type of FET device is suited for high-power use in amplifiers and switching applications?

a. JFET

b. DE-MOSFET

c. E-MOSFET

d. V-MOSFET

....

25. | D7 | b | Floyd E.D. | 0890 | C | R.B. |

What are the names for the three leads of a UJT?

a. Emitter, base, collector

b. Emitter, base 1, base 2

c. Source, gate, drain

d. Anode, cathode, gate

....

26. | D7 | d | IML Mod. 5 | 0890 | C | R.B. |

Which three-terminal semiconductor device is used as a switching device in oscillators and circuits, and has a firing point controlled by a fixed voltage ratio inside the component?

a. BJT

b. FET

c. VDR

d. UJT

....

27. | D7 | b | Floyd E.D. | 0890 | C | R.B. | ART

In Figure D7.1, which schematic symbol represents a UJT?

a. b. c. d.

....

28. | D7 | b | Malvino | 0890 | C | R.B. | ART

Refer to Figure D7.2. If this transistor has an efficiency of .82, what is the ideal emitter current?

a. 40mA

b. 44mA

c. 50mA

d. 54mA

....

29. | D8 | d | Floyd E.D. | 0890 | C | R.B. |

What are the names for the three leads of a PUT?

a. Emitter, base, collector

b. Emitter, base 1, base 2

c. Source, gate, drain

d. Anode, cathode, gate

....

30. | D8 | a | Floyd E.D. | 0890 | C | R.B. |

What must the polarity of the biasing voltage be at the gate of a PUT in order for the device to operate properly?

a. Positive

b. Negative

c. Neutral

....

31. | D8 | b | IML Mod. 5 | 0890 | C | R.B. |

Which programmable switching device has a voltage ratio that controls the firing point?

a. UJT

b. PUT

c. FET

d. JFET

....

32. | D8 | c | Floyd E.D. | 0890 | C | R.B. | ART

Which schematic symbol in Figure D8.1 represents a PUT?

a. b. c. d.

....

33. | D9 | d | Floyd E.D. | 0890 | C | R.B. | ART

Which schematic diagram in Figure D9.1 represents a DIAC?

a. b. c. d.

....

34. | D9 | a | MAVCC BE2 | 0890 | C | R.B. |

Which device is defined as a bidirectional trigger diode?

a. DIAC

b. SCR

c. FET

d. UJT

....

35. | D9 | c | Floyd E.D. | 0890 | C | R.B. |

Having only two leads, which device is classified in the thyristor family of bilateral devices?

a. BJT

b. FET

c. DIAC

d. TRIAC

....

36. | D9 | a | Hazen | 0890 | C | R.B. |

A DIAC can be used at the input of an AC circuit as a surge protection device.

a. True

b. False

....
37. | D10 | d | Malvino | 0890 | C | R.B. |

Which thyristor is defined as a three-terminal device that can be made to conduct current from its anode terminal to its cathode terminal by application of a short-duration positive voltage at its gate terminal?

a. Rectifier diode

b. DIAC

c. FET

d. SCR

....
38. | D10 | a | Floyd E.D. | 0890 | C | R.B. | ART

Which schematic symbol in Figure D10.1 represent an SCR?

a. b. c. d.

....
39. | D10 | c | Floyd E.D. | 0890 | C | R.B. |

Which SCR part requires a positive voltage to turn on the device?

a. Anode

b. Cathode

c. Gate

d. Base

....
40. | D10 | d | Malvino | 0890 | C | R.B. |

What is the minimum anode current called that keeps an SCR in the conduction mode?

a. Forward current

b. Reverse current

c. Gate current

d. Holding current

....
41. | D11 | a | Floyd E.D. | 0890 | C | R.B. | ART

Which schematic diagram in Figure D11.1 represent a TRIAC?

a.   b.   c.   d.

....
42. | D11 | b | Malvino | 0890 | C | R.B. |

A TRIAC acts as three SCRs in parallel.

a. True

b. False

....
43. | D11 | d | Floyd E.D. | 0890 | C | R.B. |

Which type of semiconductor device is a TRIAC?

a. Thermistor

b. Varistor

c. Transistor

d. Thyristor

....
44. | D11 | b | Floyd E.D. | 0890 | C | R.B. |

A TRIAC can be controlled by applying a voltage pulse at the anode.

a. True

b. False

....

45. | D12 | b | Hazen | 0890 | C | R.B. |

Which component is classified as a VDR?

a. Transistor

b. Varistor

c. Thermistor

d. Varactor

....

46. | D12 | a | Hazen | 0890 | C | R.B. |

What does the resistance of a varistor do as voltage increases across it?

a. Decreases

b. Increases

c. Remains the same

....

47. | D12 | a | Hazen | 0890 | C | R.B. |

What does the acronym VDR stand for?

a. Voltage dependent resistor

b. Variable degaussing resistor

c. Voltage dependent ring

d. Variable diode release

....
49. | D13 | b | Floyd E.D. | 0890 | C | R.B. |

To check the forward direction of current flow through a diode, the positive lead of an ohmmeter should be placed on the cathode side, and the negative lead of the meter should be placed on the anode side.

a. True

b. False

....
50. | D13 | a | Floyd E.D. | 0890 | C | R.B. |

To check the reverse direction of current flow through a diode, the negative lead of an ohmmeter should be placed on the anode side, and the positive lead of the meter should be placed on the cathode side.

a. True

b. False

....
51. | D13 | b | Floyd E.D. | 0890 | C | R.B. |

When measuring the forward direction of a good diode, what resistance reading should be obtained?

a. Zero ohms

b. Low ohms

c. High ohms

d. Infinite ohms

....
52. | D13 | c | Floyd E.D. | 0890 | C | R.B. |

When measuring the reverse direction of a good diode, what resistance reading should be obtained?

a. Zero ohms

b. Low ohms

c. High ohms

d. Infinite ohms

....

53. | D14 | a | Floyd E.D. | 0890 | C | R.B. |

An ohmmeter can be used to provide a simple test for open or shorted junctions in a bipolar transistor.

a. True

b. False

....

54. | D14 | d | Floyd E.D. | 0890 | C | R.B. |

Which instrument can be used to display transistor characteristics such as a family of collector curves?

a. DMM

b. Oscilloscope

c. VTVM

d. Curve tracer

....

55. | D14 | b | Floyd E.D. | 0890 | C | R.B. |

What resistance reading for a base-emitter junction should be obtained when a bipolar transistor is checked in the forward direction with an ohmmeter?

a. Zero ohms

b. Low ohms

c. High ohms

d. Infinite ohms

....

56. | D14 | b | Floyd E.D. | 0890 | C | R.B. |

Current leakage of a transistor can be checked with an ohmmeter.

a. True

b. False

....

57. | D15 | c | IML Mod. 5 | 0890 | C | R.B. |

When checking an SCR with an ohmmeter, what should the resistance reading be when the negative lead is placed at the cathode and the positive lead is placed at the anode?

a. Zero ohms

b. Low ohms

c. High ohms

d. Infinite ohms

....

58. | D15 | c | IML Mod. 5 | 0890 | C | R.B. |

When checking an SCR with an ohmmeter, what should the resistance reading be when the negative lead is placed at the anode and the positive lead is placed at the cathode?

a. Zero ohms

b. Low ohms

c. High ohms

d. Infinite ohms

....

59. | D15 | b | IML Mod. 5 | 0890 | C | R.B. |

When checking an SCR with an ohmmeter, what should the resistance reading be when the negative lead is placed at the cathode and the positive lead is placed at the anode after the anode has been shorted to the gate momentarily?

a. Zero ohms

b. Low ohms

c. High ohms

d. Infinite ohms

....
60. | D15 | b | Malvino | 0890 | C | R.B. |

When using an ohmmeter, what is wrong with the SCR if zero resistance is measured between its anode and cathode before a pulse is applied at the gate?

a. Open

b. Shorted

c. Leaking

....

61. | D16 | a | Floyd E.D. | 0890 | C | R.B. |

The typical maximum ratings that are given for bipolar transistors on data sheets are: collector-to-base voltage, collector-to-emitter voltage, emitter-to-base voltage, collector current, and power dissipation.

a. True

b. False

....

62. | D16 | c | Floyd E.D. | 0890 | C | R.B. |

A transistor is to be operated with V_{CE} = 8V if its maximum power rating is .4W. What is the most collector current that it can withstand?

a. 20mA

b. 32mA

c. 50mA

d. 80mA

....

63. | D16 | b | Floyd E.D. | 0890 | C | R.B. |

A transistor has a PD maximum of 1.5W at 25 degrees Celsius. The derating factor is 7mW per Celsius. What is the PD maximum at a temperature at 75 degrees Celsius?

a. 1W

b. 1.15W

c. 1.25W

d. 1.5W

....
64. | D16 | a | Floyd E.D. | 0890 | C | R.B. |

A transistor has a PD maximum of 2W, the I_C = 50mA and the V_{CE} = 50V DC. Will this transistor work without exceeding the power dissipation?

a. No

b. Yes

c. Sometimes

....
65. | D17 | c | IML Mod. 5 | 0890 | C | R.B. |

What is the common name for a mass of metal that is connected to a device to draw heat away from that device?

a. Heater

b. Heat seeker

c. Heat sink

d. Heat absorber

....
66. | D17 | b | Malvino | 0890 | C | R.B. |

When replacing a semiconductor device in a circuit, the power to the circuit should be left on.

a. True

b. False

....
67. | D17 | c | Malvino | 0890 | C | R.B. |

What should the length of leads be on semiconductor devices that are being installed into high-frequency instruments?

a. Long

b. Medium

c. Short as possible

d. Doesn't matter

....
68. | D17 | a | Malvino | 0890 | C | R.B. |

Polarity needs to be observed when replacing a diode in a circuit.

a. True

b. False

....
69. | D17, J3 | b | Heathkit | 0890 | C | D.M. |

What standard connections would be used on a phototransistor when it is to be used as a photodiode?

a. Emitter and base leads, leaving collector lead open

b. Collector and base leads, leaving emitter lead open

c. Emitter and collector leads, leaving base lead open

d. None of the above

....

1. | E1 | d | Malvino | 0890 | C | B.C. |

Which is the main advantage of the common collector configuration?

a. Low power loss with high gain

b. High power loss with high gain

c. Low input impedance with high output impedance

d. High input impedance with low output impedance

....

2. | E1 | b | Malvino | 0890 | C | B.C. | ART

What is the DC voltage at the emitter in Figure E1.1?

a. 0.7

b. 3.1

c. 3.8

d. 4.5

....

3. | E1 | a | Malvino | 0890 | C | B.C. | ART

What is the approximate voltage gain of the circuit in Figure E1.1?
($A = r_L / 25$)

a. 60

b. 120

c. 180

d. 7,200

....

4. | E1 | d | Malvino | 0890 | C | B.C. | ART

Which describes the transistor circuit configuration in Figure E1.1?

a. Common ground

b. Common collector

c. Common base

d. Common emitter

....

5. | E1 | b | Malvino | 0890 | C | B.C. | ART

What is the DC voltage at the base in Figure E1.1?

a. 0.7

b. 3.8

c. 6.7

d. 31.2

....
6. | E2 | a | Shrader | 0890 | C | B.C. |

Which electronic device is similar in operating principles to the FET?

a. Triode vacuum tube

b. TRIAC

c. DIAC

d. LED

....
7. | E2 | b | Shrader | 0890 | C | B.C. |

Which term describes the ability of a FET to control its output signal current?

a. Transmutation

b. Transconductance

c. Siemens

d. None of the above

....
8. | E2 | a | Malvino | 0890 | C | B.C. |

Which is a purpose of a JFET device?

a. Voltage control

b. Current control

c. Low input resistance

d. Emits light

....
9. | E2 | c | Malvino | 0890 | C | B.C. |

What is the input impedance of a JFET amplifier?

a. Nearly zero

b. Close to unity (one)

c. Approaches infinity

d. Impossible to predict

....
10. | E3 | a | Malvino | 0890 | C | B.C. |

Which two points are connected by the feedback resistor in an operational amplifier circuit?

a. Output to inverting input

b. Output to noninverting input

c. Inverting input to noninverting input

d. Output to ground

....
11. | E3 | d | Malvino | 0890 | C | B.C. |

Which characteristic of an operational amplifier circuit describes its ability to output exactly 0V with 0V input?

a. DC ripple

b. Input resistance

c. Slew rate

d. Offset voltage

....
12. | E3 | a | Malvino | 0890 | C | B.C. |

Which term describes the increase of voltage in an operational amplifier circuit over a period of time?

a. Slew rate

b. Frequency

c. Offset voltage

d. Power

....

13. | E3 | a | Malvino | 0890 | C | B.C. |

What is the gain of an operational amplifier if the input signal is 2.5 microvolts and the output voltage is .5 millivolts?

a. 200

b. 2,000

c. 20,000

d. 200,000

....

14. | E3 | a | Malvino | 0890 | C | B.C. | ART

Identify the formula for calculating the output voltage of the inverting summing amplifier in Figure E3.1.

a. $[(R_3E_1) / R_1] + [(R_3E_2) / R_2]$

b. $(E_1 + E_2) R_3 / (R_1 + R_2)$

c. $R_1 + 1 / R_2 + 1$

d. $(E_1 / R_1 + E_2 / R_L) R_3$

....

15. | E3, E6 | d | Malvino | 0890 | C | B.C. |

Which is true when changes of the load resistance at the output of an operational amplifier have little or no effect on the signal voltage at the load?

a. Amplifier gain is low.

b. Open-circuit gain of the op amp increases when R_L is decreased.

c. Output impedance of the op amp is well matched to R_L.

d. Output impedance of the op amp is low.

....

16. | E4 | c | Malvino | 0890 | C | B.C. | ART

Which symptom indicates that the bypass capacitor is open in Figure E1.1?

a. No DC or signal at the collector

b. No DC or signal at the emitter

c. Distorted signal at the collector

d. Distorted signal at the source

....

17. | E4 | a | Malvino | 0890 | C | B.C. | ART

What will happen to the signal voltage at the collector of the transistor circuit in Figure E1.1 if the load resistor becomes open?

a. Increase

b. Decrease

c. Remain the same

d. Go to zero

....

18. | E4 | d | Malvino | 0890 | C | B.C. | ART

What would happen to the signal voltage at the collector if the V_{CC} goes to 0 in the circuit in Figure E1.1?

a. Increase

b. Decrease

c. Remain the same

d. Go to zero

....

19. | E4 | a | Malvino | 0890 | C | B.C. | ART

Which symptom indicates an open collector resistor in Figure E1.1?

a. No DC or signal at the collector

b. No DC or signal at the emitter

c. Distorted signal at the collector

d. Distorted signal at the base

....
20. | E6 | b | Malvino | 0890 | C | B.C. | ART

Which problem will cause V_{out} in Figure E6.1 to become clipped?

a. $+V_{CC}$ and $-V_{CC}$ increase

b. $+V_{CC}$ and $-V_{CC}$ decrease

c. R_F decreases in value

d. R_1 increases in value

....
21. | E6 | b | Malvino | 0890 | C | B.C. | ART

Which problem will cause V_{out} in Figure E6.1 to be zero?

a. $+V_{CC}$ and $-V_{CC}$ increase

b. Power supply failure

c. R_F decreases in value

d. R_1 increases in value

....
22. | E6 | c | Malvino | 0890 | C | B.C. | ART

What kind of operating voltage is required for most operational amplifier circuits, such as in Figure E6.1?

a. High supply voltage (usually 32 volts)

b. A supply providing +12.6 volts

c. Dual voltage (with equal positive and negative voltages)

d. Solar cell connected in parallel with a D size battery

....

23. | E6 | b | Malvino | 0890 | C | B.C. | ART

When would a circuit similar to that in Figure E6.2 be used?

a. Never

b. To match high impedance source and low impedance load

c. To decrease frequency range

d. To increase the open loop gain

....

24. | E6 | a | Malvino | 0890 | C | B.C. | ART

Which problem will cause no output voltage in Figure E6.3?

a. Inverting input shorted to ground

b. Operational amplifier with greater than normal open loop gain

c. Input current source producing 5 mA instead of 1 mA

d. An open in the noninverting input

....
25. | E7 | d | Malvino | 0890 | C | B.C. |

When a coupling capacitor is used in the input circuit, what does a low audio frequency produce?

a. Lower input impedance

b. Lower output impedance

c. Lower mid-band voltage gain

d. None of the above

....
26. | E7 | a | MAVCC BE2 | 0890 | C | B.C. |

Broad frequency response and DC isolation are two reasons why resistance-capacitance coupling is used.

a. True

b. False

....
27. | E7 | a | MAVCC BE2 | 0890 | C | B.C. |

Impedance coupling is used when a narrow band of frequencies or a single frequency is to be amplified.

a. True

b. False

....
28. | E7 | b | MAVCC BE2 | 0890 | C | B.C. |

Transformer coupling is the preferred method of interstage coupling when DC or low frequency is involved.

a. True

b. False

....
29. | E7 | a | MAVCC BE2 | 0890 | C | B.C. |

Direct coupling is the preferred method of interstage coupling when DC or low frequency is involved.

a. True

b. False

....
30. | E7 | b | MAVCC BE2 | 0890 | C | B.C. |

Direct coupling usually requires more space than other methods of interstage coupling.

a. True

b. False

....
31. | E7 | a | MAVCC BE2 | 0890 | C | B.C. |

Transformer coupling provides excellent DC isolation between amplifier stages.

a. True

b. False

....
32. | E8 | d | E&E | 0890 | C | B.C. |

Which test equipment is used to check amplifier frequency response?

a. Curve tracer and digital multimeter

b. Curve tracer and oscilloscope

c. Curve tracer and sweep-frequency generator

d. Sweep-frequency generator and oscilloscope

....
33. | E8 | b | E&E | 0890 | C | B.C. |

When checking the frequency response of high-frequency amplifiers, it is important to use low impedance test equipment.

a. True

b. False

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
3	Letter of correct answer	7	Writer(s)/reviewer(s)
	Source (author, year of publication)	8	Accompanying artwork (ART)

....
1. | F1 | c | E&E | 0890 | C | D.W. |

What will cause an oscillator to amplify?

a. Regenerative feedback

b. Bias voltage

c. Degenerative feedback

d. Output load

....
2. | F1 | a | E&E | 0890 | C | D.W. |

What will cause an amplifier to oscillate?

a. Regenerative feedback

b. Bias voltage

c. Degenerative feedback

d. Output load

....
3. | F1 | b | E&E | 0890 | C | D.W. |

What type of oscillator has a tapped coil?

a. Armstrong

b. Hartley

c. Colpitts

d. Crystal

....
4. | Fl | b | E&E | 0890 | C | D.W. |

What are oscillators used for in electronics?

a.   Amplification

b.   Frequency generation

c.   Impedance matching

d.   Selection

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....
5. | F2 | d | E&E | 0890 | C | D.W. |

What results from the distortion of a crystal?

a. Magnetic effect

b. Electrostatic effect

c. Thermoelectric effect

d. Piezoelectric effect

....
6. | F2 | d | E&E | 0890 | C | D.W. |

What type of oscillator is stable at high frequencies?

a. Armstrong

b. Hartley

c. Colpitts

d. Crystal

....
7. | F2 | b | E&E | 0890 | C | D.W. |

What determines the frequency of a crystal oscillator?

a. Tank circuit

b. Crystal

c. Transistor

d. Load resistor

....
8. | F2 | a | E&E | 0890 | C | D.W. |

The crystal-controlled oscillator is also called the Pearce oscillator.

a. True

b. False

....
9. | F3 | b | E&E | 0890 | C | D.W. |

What component determines the stabilization of a phase-lock loop?

a. Tank circuit

b. Crystal

c. Transistor

d. Load resistor

....
10. | F3 | c | E&E | 0890 | C | D.W. |

Which type of circuit uses a phase-lock loop?

a. Amplifier

b. Digital

c. Frequency generator

d. Detector

....
11. | F3 | a | E&E | 0890 | C | D.W. |

How is frequency determined in a phase-lock loop?

a. Division

b. Addition

c. Reduction

d. Subtraction

....
12. | F3, F5 | d | E&E | 0890 | C | D.W. |

How is frequency controlled in a phase-lock loop?

a. Tank circuit

b. Crystal

c. Transistor

d. Feedback

....

13. | F4 | c | E&E | 0890 | C | D.W. |

What are the two main requirements of a waveform generator?

a. Frequency and amplitude

b. Amplitude and shape

c. Frequency and shape

d. Stability and shape

....

14. | F4 | b | E&E | 0890 | C | D.W. |

What type of circuitry is best suited as a square wave generator?

a. Analog

b. Digital

c. Linear

d. Nonlinear

....

15. | F4 | d | E&E | 0890 | C | D.W. |

What is the output of a relaxation oscillator?

a. Square wave

b. Sine wave

c. Triangle wave

d. Sawtooth wave

....
16. | F4 | d | E&E | 0890 | C | D.W. |

What type of circuit will produce multiple waveforms?

a. Analog

b. Digital

c. Linear

d. Nonlinear

....

17. | F5 | c | E&E | 0890 | C | D.W. |

What symptom is indicated if there is a bad crystal in an oscillator?

a. Acts as an amplifier

b. Acts as a sawtooth oscillator

c. Incorrect frequency

d. Incorrect voltages

....

18. | F5 | b | E&E | 0890 | C | D.W. |

What test equipment is used to test the frequency of an oscillator?

a. Signal generator

b. Oscilloscope

c. Voltmeter

d. Ohmmeter

....

19. | F5 | c | E&E | 0890 | C | D.W. |

What is the result of loading down an oscillator?

a. Normal operation

b. Incorrect voltages

c. Acts as an amplifier

d. Increased frequency

....
20. | F6 | b | E&E | 0890 | C | D.W. |

What component will cause frequency drift in a phase-lock loop?

a. Tank circuit

b. Crystal

c. Transistor

d. Load resistor

....
21. | F6 | c | E&E | 0890 | C | D.W. |

What should be done if a defect is suspected in a phase-lock loop?

a. Check the voltages.

b. Check with a digital probe.

c. Check the frequency.

d. Check the detectors.

....
22. | F6 | a | E&E | 0890 | C | D.W. |

What type of test equipment is used to test a phase-lock loop?

a. Frequency counter

b. Oscilloscope

c. Voltmeter

d. Ohmmeter

....

23. | F6 | c | E&E | 0890 | C | D.W. |

What code is used to control a phase-lock loop?

a. Gray

b. PLL

c. BCD

d. Control

....

24. | F7 | b | E&E | 0890 | C | D.W. |

What test equipment should be used to check a waveform generator?

a. Signal generator

b. Oscilloscope

c. Voltmeter

d. Ohmmeter

....

25. | F7 | b | E&E | 0890 | C | D.W. |

What is a possible defect if the output of a square wave generator is distorted?

a. Input loaded

b. Output loaded

c. Input open

d. Output open

....

26. | F7 | d | E&E | 0890 | C | D.W. |

What component is possibly defective if the output of a relaxation oscillator is a constant DC voltage?

a. Static device

b. Control device

c. Passive device

d. Active device

....
27. | F7 | b | E&E | 0890 | C | D.W. |

What is possibly defective if only one waveform can be obtained from a multiple waveform generator?

a. Oscillator

b. Selector

c. Power supply

d. All of the above

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....

| G1 | 1-ac, 2-c, 3-ab, 4-d, 5-b, 6-a | Shrader | 0890 |
C | D.M. |

Match the following stages of a typical AM receiver to definitions.

1. Output section of the receiver which drives the speakers
2. Part of a receiver's tuning section; mixes the incoming signal with the oscillator signal to develop the IF signal
3. Separates audio information from the IF carrier
4. Adjusted to a fixed frequency regardless of input (Most radios have two stages.)
5. In the tuning part of the receiver, provides signal to be mixed with incoming signal to develop IF
6. Usually the first stage of a receiver; provides amplification of incoming signal

a. RF amplifier

b. Oscillator

c. Mixer

d. IF amplifier

e. Variable frequency divider

ab. Detector

ac. AF amplifier

....

7. | G1 | c | Shrader | 0890 | C | D.M. |

Which stage of an FM receiver is NOT normally found in an AM receiver?

a. Mixer

b. IF amp

c. Limiter

d. AF amp

....
8. | G2 | c | Shrader | 0890 | C | D.M. |

Which function is NOT normally found in a radio transmitter?

a. Signal generation

b. Modulation

c. Detection

d. Power amplification

....
9. | G2 | a | Shrader | 0890 | C | D.M. |

Frequency modulated transmitters generally require the use of frequency multiplier stages to achieve the desired output frequency.

a. True

b. False

....
10. | G2 | d | Frenzel | 0890 | C | D.M. |

In what class of operation can an FM power amplifier operate that is NOT permissible for an AM amplifier?

a. A

b. AB

c. B

d. C

....
11. | G2 | a | Frenzel | 0890 | C | D.M. |

The final amplifier stages in FM broadcast transmitters typically use large vacuum tubes as opposed to transistors.

a. True

b. False

....
12. | G3 | c | Frenzel | 0890 | C | D.M. |

What band of frequencies make up the microwave frequency band?

a. 1-30 KHz

b. 1-30 MHz

c. 1-30 GHz

d. 1-30 THz

....
13. | G3 | d | Adamson | 0890 | C | D.M. |

Which is NOT an advantage of microwave transmission?

a. Minimum atmospheric disturbance

b. Some degree of privacy

c. No transmission line maintenance

d. Line of sight communications

....
14. | G3 | a | Frenzel | 0890 | C | D.M. |

Microwave frequencies are used primarily for telephone communications, radar and satellite communications.

a. True

b. False

....
15. | G3 | b | Frenzel | 0890 | C | D.M. |

What is the preferred transmission line used for microwaves?

a. Coaxial

b. Waveguide

c. Balanced

d. Twin lead cable

....
16. | G4 | b | IML Mod. 6 | 0890 | C | D.M. |

What type of antenna is used by two-way radios?

a. Hertz

b. Marconi

c. Yagi

d. Hyperbolic

....
17. | G4 | c | IML Mod. 6 | 0890 | C | D.M. |

Approximately how long is a Hertz antenna for a radio station broadcasting at 150 MHz?

a. 1.64 ft.

b. 2 ft.

c. 3.28 ft.

d. 6.54 ft.

....
18. | G4 | c | Frenzel | 0890 | C | D.M. |

What is the most commonly used antenna for microwave transmission?

a. Hertz

b. Marconi

c. Parabolic

d. Yagi

....
19. | G4 | a | IML Mod. 6 | 0890 | C | D.M. |

What antenna is one-half wavelength long (also called half-wave and dipole antenna)?

a. Hertz

b. Marconi

c. Parabolic

d. Yagi

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
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....

1. | H1 | d | Hazen | 0890 | C | R.B. |

Which instrument allows the technician to view a waveform as measurements are being taken?

a. DVM

b. VOM

c. DMM

d. Oscilloscope

....

2. | H1 | a | Hazen | 0890 | C | R.B. |

What is the minimum number of cycles that has to be shown on an oscilloscope display to correctly measure a signal's frequency?

a. 1

b. 2

c. 3

d. 4

....

3. | H1 | c | Hazen | 0890 | C | R.B. |

What would the peak-to-peak voltage be of a signal displayed on an oscilloscope screen if the distance from the positive peak to the negative peak covers four vertical divisions and the volt/division control is set at 5V/div.?

a. 10V

b. 15V

c. 20V

d. 25V

....

4. | H1 | b | Hazen | 0890 | C | R.B. |

What would the frequency of a signal be where one complete cycle covered six horizontal divisions and the time/division control is set at 1ms/div.?

a. 100 hz

b. 167 hz

c. 600 hz

d. 1000 hz

....

5. | H1 | a | Crowder College | 0890 | C | B.C. |

The display on an oscilloscope shows a waveform that is 5.4 cm horizontally and 3.6 cm vertically. What is the peak-to-peak voltage? (The settings are 0.2V/div. and 0.5 microseconds/div.)

a. 0.72

b. 1.02

c. 1.08

d. 7.2

e. 10.8

....

6. | H1 | a | Crowder College | 0890 | C | B.C. |

The display on an oscilloscope is 6.9 cm horizontally and 5.5 cm vertically. The settings of the 'scope are 10V/div. and 20 microseconds/div. What is the peak-to-peak voltage?

a. 55

b. 69

c. 488

d. 550

e. 690

....
7. | H2 | c | E&E | 0890 | C | P.M. |

What type of meter is connected in parallel when measuring voltage across a component?

a. Ohmmeter

b. Ammeter

c. Voltmeter

d. Wattmeter

....
8. | H2 | d | E&E | 0890 | C | P.M. |

What multimeter switches a multiplier resistor in series with the meter movement?

a. Ammeter

b. Wattmeter

c. Ohmmeter

d. Voltmeter

....
9. | H2 | a | E&E | 0890 | C | P.M. |

What multimeter uses a shunt resistor in parallel with the meter movement?

a. Ammeter

b. Ohmmeter

c. Voltmeter

d. Wattmeter

....
10. | H2 | b | E&E | 0890 | C | P.M. |

What type of test equipment converts the formula P = I x E into a readout?

a. Voltmeter

b. Wattmeter

c. Ammeter

d. Frequency counter

....
11. | H2 | a | E&E | 0890 | C | P.M. |

What function on a multimeter uses its own power source?

a. Ohmmeter

b. Voltmeter

c. Ammeter

d. Wattmeter

....
12. | H2 | b | Crowder College | 0890 | C | B.C. |

A typical bench-type AC voltmeter indicates 35 volts AC. What is the RMS value?

a. 24.7

b. 35

c. 49.5

d. 70

e. 99

. . . .
13. | H2 | e | Crowder College | 0890 | C | B.C. |

A typical bench-type AC voltmeter indicates 12 volts across a 1200-ohm resistor. What is the peak-to-peak current?

a. 7.07 mA

b. 10 mA

c. 14.1 mA

d. 19.9 mA

e. 28.3 mA

....
14. | H3 | b | Mfg. spec. | 0890 | C | B.C. |

How is the gain or amplitude control used on the signal generator?

a. Vary frequency output

b. Vary peak-to-peak output

c. Vary phase output

d. Vary frequency input

....
15. | H3 | a | Mfg. spec. | 0890 | C | B.C. |

How is the multiplier control used on the signal generator?

a. Vary frequency output

b. Vary peak-to-peak output

c. Vary phase output

d. Vary frequency input

....
16. | H3 | b | Owner/operator manual | 0890 | C | B.C. |

The duty control of a function generator adjusts the duty cycle only--not the frequency of the output.

a. True

b. False

....
17. | H3 | d | Operator's manual | 0890 | C | B.C. |

Which function generator control is used to establish the DC level and polarity of the signal at the output?

a. Amplitude

b. DC main output

c. DC/frequency

d. DC offset

....

18. | H4 | c | Ins-Meas | 0890 | C | B.C. |

Which measurement is made when counting the number of seconds between events?

a. Frequency

b. Period

c. Time interval

d. Event

....

19. | H4 | b | Ins-Meas | 0890 | C | B.C. |

Which is used to give the electronic counter a stable time reference?

a. Time-period oscillator

b. Time-base oscillator

c. External reference

d. Decade oscillator

....

20. | H4 | a | Ins-Meas | 0890 | C | B.C. |

A frequency counter's decade counting and display unit also contain the overrange circuit.

a. True

b. False

....
21. | H4 | d | Ins-Meas | 0890 | C | B.C. |

Which are time-base accuracy specifications for a frequency counter?

a. Frequency range, sensitivity, impedance

b. Sensitivity, temperature stability, aging rate

c. Impedance, temperature stability, set tolerance

d. Temperature stability, aging rate, set tolerance

....
22. | H4 | a | Ins-Meas | 0890 | C | B.C. |

Normally, the maximum input voltage is higher for a 1 megohm input than for a 50 ohm input.

a. True

b. False

....
23. | H5 | b | H-P | 0890 | C | B.C. |

A logic analyzer is especially useful when examining small transitions of a digital waveform.

a. True

b. False

....
24. | H5 | a | H-P | 0890 | C | B.C. |

When used as a timing analyzer, a logic analyzer is similar to an oscilloscope.

a. True

b. False

....
25. | H5 | a | H-P | 0890 | C | B.C. |

Using a timing analyzer is like using a digitizing oscilloscope with only one bit of vertical resolution.

a. True

b. False

....
26. | H5 | b | H-P | 0890 | C | B.C. |

A timing analyzer uses the system's clock, while a state analyzer has an internal clock.

a. True

b. False

....
27. | H6 | a | Kleitz | 0890 | C | R.M. |

A logic probe is used to troubleshoot what type of circuit?

a. Digital

b. Resistive

c. Capacitive

d. Inductive

....
28. | H6 | b | Kleitz | 0890 | C | R.M. |

When troubleshooting a digital circuit, the logic probe is applied to a test point on the I.C. that has a level of 5 volts. Which indicator will light?

a. Low

b. High

c. Floating

d. Pulse

....
29. | H6 | c | Kleitz | 0890 | C | R.M. |

When troubleshooting with a logic probe, it is applied to a circuit test point which has a voltage level of .3 volts. Which indicator on the probe will light?

a. Pulse

b. High

c. Low

d. Floating

....

30. | H6 | a | Kleitz | 0890 | C | R.M. |

An external power source must be used with a logic probe.

a. True

b. False

....

31. | H7 | c |IML Mod. 8 | 0890 | C | M.M. |

What is the purpose of an RS-232C breakout box?

a. Monitor the data bus inside a microcomputer system

b. Monitor the control bus inside a microcomputer system

c. Monitor the serial communications link between microcomputer and peripherals

d. Disconnect microcomputer peripherals

....

32. | H7 | b | IML Mod. 8 | 0890 | C | M.M. |

A logic clip can be used in place of a breakout box.

a. True

b. False

....

33. | H7 | b | IML Mod. 8 | 0890 | C | M.M. |

The breakout box effectively disconnects the peripheral so it will no longer function.

a. True

b. False

....

34. | H7 | a | IML Mod. 8 | 0890 | C | M.M. |

A powered breakout box will NOT affect the signal voltage.

a. True

b. False

....

35. | H7,8 | d | IML Mod. 8 | 0890 | C | M.M. |

For what type of troubleshooting is a breakout box useful?

a. Power supply failure

b. CPU failure

c. Memory failure

d. Data communications failure

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....
1. | I1 | a | IML Mod. 8 | 0890 | C | M.M. |

Which is NOT a bus in a typical microcomputer system?

a. Instruction bus

b. Address bus

c. Data bus

d. Control bus

....
2. | I1 | b | IML Mod. 8 | 0890 | C | M.M. |

On which bus does the CPU place the enabled memory location?

a. Instruction bus

b. Address bus

c. Data bus

d. Control bus

....
3. | I1 | d | IML Mod. 8 | 0890 | C | M.M. |

What part of the CPU performs all arithmetic and logic operations?

a. Math unit

b. Instruction decoder

c. Memory

d. ALU

....
4. | I1 | d | IML Mod. 8 | 0890 | C | M.M. |

Which bus identifies data transfer direction between CPU and memory?

a. Instruction bus

b. Data bus

c. Address bus

d. Control bus

....
5. | I1 | c | IML Mod. 8 | 0890 | C | M.M. |

Which identifies the point at which data enters or exits a microcomputer system?

a. Data bus

b. Peripheral unit

c. Port

d. ALU

....
6. | I1 | b | IML Mod. 8 | 0890 | C | M.M. |

The Apple II computer uses a 6502 CPU.

a. True

b. False

....
7. | I1 | a | IML Mod. 8 | 0890 | C | M.M. |

What is another name for computer data?

a. Operand

b. Op code

c. Mnemonic

d. Instruction

....

8. | I1 | b | IML Mod. 8 | 0890 | C | M.M. |

What is a binary or hexadecimal instruction called?

a. Mnemonic

b. Op code

c. Operand

d. Address

....
9. | I2 | a | IML Mod. 8 | 0890 | C | M.M. |

BASIC can be described as a high-level language.

a. True

b. False

....
10. | I2 | c | IML Mod. 8 | 0890 | C | M.M. |

Which can be described as a low-level language?

a. BASIC

b. PASCAL

c. Assembly language

d. FORTRAN

....
11. | I2 | b | IML Mod. 8 | 0890 | C | M.M. |

Which language is the lowest level language in which the CPU is programmed with ones and zeroes?

a. Assembly language

b. Machine language

c. Digital language

d. COBOL

....
12. | I2 | a | IML Mod. 8 | 0890 | C | M.M. |

In which low-level language does the programmer use mnemonics, which are later converted to binary with ones and zeroes?

a. Assembly language

b. Machine language

c. Digital language

d. COBOL

....

13. | I3 | b | IML Mod. 8 | 0890 | C | M.M. |

The basic input output system (BIOS) is stored in RAM.

a. True

b. False

....

14. | I3 | b | IML Mod. 8 | 0890 | C | M.M. |

DOS stands for Digital Operating System.

a. True

b. False

....

15. | I3 | c | IML Mod. 8 | 0890 | C | M.M. |

For which microcomputer system was MS-DOS made?

a. Apple

b. Commodore

c. IBM

d. All microcomputer systems

....

16. | I3 | a | IML Mod. 8 | 0890 | C | M.M. |

Internal DOS commands do NOT need to access the disk every time the command is used.

a. True

b. False

....
17. | I4 | a | IML Mod. 8 | 0890 | C | B.C. |

From the Debug - prompt, an operator enters the Debug hexadecimal calculator mode by typing H followed by two hex numbers, 3 and 7. What is the Debug response?

a. A4, the sum and difference in hex

b. 4A, the difference and sum in hex

c. 1010 1000, the sum and difference in binary

d. 1000 1010, the difference and sum in binary

....
18. | I4 | a | IML Mod. 8 | 0890 | C | B.C. |

Debug will display all of the internal registers on the screen at one time by typing R.

a. True

b. False

....
19. | I4 | d | IML Mod. 8 | 0890 | C | B.C. |

Which instructions will combine the contents of the AX register with the BX register?

a. COM AX,BX

b. COM BX,AX

c. ADD AX,BX

d. ADD BX,AX

....

20. | I4 | b | IML Mod. 8 | 0890 | C | B.C. |

Which instruction has a function similar to the BASIC GOSUB command?

a. GSB

b. INT

c. MOV

d. COM

....

21. | I4, I5 | a | IML Mod. 8 | 0890 | C | B.C. |

Refer to the program listing below. What happens when the instruction at 0100 is implemented?

```
0100 MOV DL,[200]
0104 MOV AH,5
0106 INT 21
0108 MOV DL,[201]
100C MOV AH,5
010E INT 21
0110 MOV DL,[202]
```

a. Contents of memory 0200$_H$ are placed in DL.

b. Contents of DL are placed in memory 0200$_H$.

c. 0200$_H$ is placed in DL.

d. Contents of DL are added to memory 0200$_H$.

....

22. | I4, I5 | c | IML Mod. 8 | 0890 | C | B.C. |

Using the program below, what would be the result if the instruction at 0200 had the brackets deleted?

```
0100 MOV DL,[200]
0104 MOV AH,5
0106 INT 21
0108 MOV DL,[201]
100C MOV AH,5
010E INT 21
0110 MOV DL,[202]
```

a. Contents of memory 0200_H are placed in DL.

b. Contents of DL are placed in memory 0200_H.

c. 0200_H is placed in DL.

d. Contents of DL are placed in memory 0200_H.

....

23. | I4, I5 | b | IML Mod. 8 | 0890 | C | B.C. |

Examine the program below. Which line will place a "pointer" address into the BX register?

a. 0100

b. 0103

c. 0106

d. 010C

```
0100 MOV CX,xx
0103 MOV BX,11A
0106 MOV DL,[BX]
0108 MOV AH,5
010A INT 21
010C INC BX
010D LOOP 106
010F INT 20
011A DB 'Electronics Technology' 0D,0A
```

....

24. | I4, I5 | b | IML Mod. 8 | 0890 | C | B.C. |

Examine the program below. Which line is used to prepare the BX register to point to the next character to be printed?

a. 0100

b. 0103

c. 0106

d. 010C

```
0100 MOV CX,xx
0103 MOV BX,11A
0106 MOV DL,[BX]
0108 MOV AH,5
010A INT 21
010C INC BX
010D LOOP 106
010F INT 20
011A DB 'Electronics Technology' 0D,0A
```

....

25. | I7 | d | IML Mod. 8 | 0890 | C | B.C. |

Which three sets of signals are needed for interface experiments?

a. $\overline{\text{IREQ}}$, MEMR and MEMW

b. Data, address and clock

c. Data, clock and control

d. Data, control and address

....

26. | I7 | a | IML Mod. 8 | 0890 | C | B.C. |

Which is a support chip used to simplify interface design?

a. PPI

b. ALU

c. RS232

d. MPU

....

27. | I7 | a | IML Mod. 8 | 0890 | C | B.C. |

Which are common interface standards used with data communications equipment?

a. RS232, Centronics, IEEE-488

b. PPI, PIA, CPU

c. PPI, RS232, Centronics

d. RS1844, RS248, RS232

....
28. | I7 | b | IML Mod. 8 | 0890 | C | B.C. |

Why do bus signals to the breadboard need to be buffered?

a. The PC must be physically close to the project.

b. The PC can only supply about two TTL fanouts per slot.

c. It prevents interconnection capacitance.

d. The PC must be able to distinguish different signals.

....
29. | I8 | a | MAVCC | 0890 | C | B.C. |

Which is a communications exchange that is accomplished with hardware?

a. Handshake

b. Interface

c. Parity

d. Protocol

....
30. | I8 | c | MAVCC | 0890 | C | BC |

Which describes keeping one thing equal to another?

a. Handshake

b. Interface

c. Parity

d. Protocol

....
31. | I8 | d | MAVCC | 0890 | C | B.C. |

Which is a communications exchange accomplished with software?

a. Handshake

b. Interface

c. Parity

d. Protocol

....
32. | I8 | b | MAVCC | 0890 | C | B.C. |

Which describes the point of connection between two components within a system and/or the connecting device?

a. Handshake

b. Interface

c. Defacto

d. Protocol

....
33. | I9 | b | V-TECS | 0890 | C | B.C. |

If a customer noted that the system would not run a certain program and a known good copy of the program did not work, which test would the technician run?

a. Motherboard ROM

b. Motherboard RAM

c. Keyboard

d. Disk drive

....
34. | I9 | a | V-TECS | 0890 | C | B.C. |

Which test should the technician run if the customer is having problems with a graphics tablet or pen?

a. Graphics tablet

b. Graphics display

c. Monitor

d. Keyboard

....
35. | I9 | c | V-TECS | 0890 | C | B.C. |

Which cleaner should be used to clean non-metallic parts?

a. High residue

b. Low residue

c. Soap and water

d. Strong degreaser

....

36. | I9 | c | MAVCC | 0890 | C | B.C. |

When troubleshooting hardware, which should be checked first?

a. Microprocessor

b. Clock

c. Power supply

d. Address and data busses

....

37. | I9 | b | MAVCC | 0890 | C | B.C. |

Diagnostic software is NOT a helpful troubleshooting tool even when the microprocessor or disk drive is operational enough to run the diagnostics.

a. True

b. False

....

38. | I9 | c | MAVCC | 0890 | C | B.C. |

Which troubleshooting method describes the mass replacement of components?

a. Diagnostics

b. Systematic troubleshooting

c. Shotgunning

d. Generic troubleshooting

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....

1. | J1 | c | Frenzel | 0890 | C | D.M. |

What spectrum includes ultraviolet, infrared and visible light?

a. X-ray

b. Sonic

c. Optical

d. Magnetic

....

2. | J1 | d | Frenzel | 0890 | C | D.M. |

When a light ray passes from one medium to another, it is bent. What is this called?

a. Absorption

b. Diffraction

c. Reflection

d. Refraction

....

3. | J1 | a | Adamson | 0890 | C | D.M. |

What particles make up light?

a. Photons

b. Protons

c. Electrons

d. Neutrons

....
4. | J1 | c | Frenzel | 0890 | C | D.M. |

What unit is used to measure the wavelength of visible light?

a. Meter

b. Centimeter

c. Nanometer

d. Picometer

....

5. | J2 | b | Frenzel | 0890 | C | D.M. |

Light-emitting diodes are used as main light sources for which systems?

a. Short distance, high speed

b. Short distance, low speed

c. Long distance, high speed

d. Long distance, low speed

....

6. | J2 | c | Frenzel | 0890 | C | D.M. |

Which is commonly used as a photodetector?

a. Silicon-controlled rectifier

b. TRIAC

c. Photodiode

d. Injection laser diode

....

7. | J2 | d | Frenzel | 0890 | C | D.M. |

Which photodetector is most commonly used in optical electronics?

a. Avalanche photodiode

b. Phototransistor

c. Light-emitting diode

d. Photodiode

....
8. | J2 | a | Frenzel | 0890 | C | D.M. |

What is the bias condition of an LED during normal operation?

a. Forward biased

b. Reverse biased

c. Self-biased

d. Undetermined

....
9. | J3 | a | Ala. | 0890 | C | D.M. |

For which application is a phototransistor preferred over a photodiode?

a. Higher output current is required and response speed is not critical.

b. High-speed response is required and current output is not critical.

c. Low sensitivity can be tolerated.

d. Dark current cannot be tolerated.

....
10. | J3, D17 | b | Ala. | 0890 | C | D.M. |

What connections would be used on a phototransistor when it is to be used as a photodiode?

a. Emitter and base leads, leaving collector lead open

b. Collector and base leads, leaving emitter lead open

c. Emitter and collector leads, leaving base lead open

d. None of the above

....
11. | J3 | a | Frenzel | 0890 | C | D.M. |

What composition of fiber optic cable core would cause the LEAST attenuation?

a. Wide glass

b. Narrow glass

c. Wide plastic

d. Narrow plastic

....
12. | J3 | b | Frenzel | 0890 | C | D.M. |

Compared to wire cable, one disadvantage of fiber optic cable is that it cannot be spliced.

a. True

b. False

....
13. | J4 | a | Mind Systems | 0890 | C | D.M. |

Which device passes a narrow band of the optical spectrum?

a. Filter

b. Lens

c. Beam splitter

d. Reflector

....
14. | J4 | c | Mind Systems | 0890 | C | D.M. |

What device bends light?

a. Beam splitter

b. Filter

c. Lens

d. Reflector

....
15. | J4 | c | Mind Systems | 0890 | C | D.M. |

What effect does a convex lens have on the spreading of a light beam?

a. Increases

b. No affect

c. Reduces

d. Stops

....
16. | J4 | b | Adamson | 0890 | C | D.M. |

Which PN junction is designed to detect light?

a. Light-emitting diode

b. Photodiode

c. Photoresistor

d. Optocoupler

....
17. | J5 | d | Ala. | 0890 | C | D.M. |

What is another term for the loss of information caused by propagation delays in an optical fiber transmission system?

a. Attenuation

b. Coupling loss

c. Numerical aperture loss

d. Dispersion

....
| J5 | 18-c, 19-e, 20-ab, 21-b, 22-a | Frenzel | 0890 |
C | D.M. | ART

Figure J5.1 shows the basic elements of a fiber-optic communications system. Match the components to appropriate functions.

18. #1

19. #2

20. #3

21. #4

22. #5

a. Decoder

b. Receiver

c. Encoder

d. Antenna

e. Transmitter

ab. Fiber-optic cable

....
23. | J5 | a | Frenzel | 0890 | C | D.M. |

One advantage of using fiber-optic cable for television systems is its wide bandwidths.

a. True

b. False

....

24. | J6 | b | Malvino | 0890 | C | D.M. |

What is the typical voltage drop of a forward-biased light-emitting diode?

a. .5-1

b. 1-2

c. 3-4

d. 4-5

....

25. | J6 | b | IML Mod. 9 | 0890 | C | D.M. |

At least how many volts must the ohmmeter battery be to test an LED as a diode?

a. .7

b. 2.0

c. 4.0

d. 6.3

....

26. | J6 | b | IML Mod. 9 | 0890 | C | D.M. |

Which is the most appropriate reference to find the pin configuration of a seven-segment LED display?

a. Underside of the display

b. Manufacturer's literature

c. Schematic diagram

d. Marked at each pin

....

27. | J6 | d | IML Mod. 9 | 0890 | C | D.M. |

The "g" segment of a seven-segment LED display glows when the numbers 3, 5, 6, 8 or 9 are displayed but does not glow when the number 2 is displayed. What is the most likely problem?

a. Open "g" bar

b. Current-limiting resistor

c. No problem indicated

d. Decoder driver

....
28. | J7 | d | IML Mod. 9 | 0890 | C | D.M. |

Which is NOT a part of the ruby laser?

a. Flash tube

b. Mirrored end

c. Partially mirrored end

d. Transparent end

....
29. | J7 | a | IML Mod. 9 | 0890 | C | D.M. |

The laser and maser both operate using the concept of stimulated emission.

a. True

b. False

....
30. | J7 | c | IML Mod. 9 | 0890 | C | D.M. |

Which statement applies to the ruby laser?

a. In 1990, operated at above 75% efficiency

b. Contains an internal cathode and anode

c. Excitation obtained using a powerful flash lamp

d. Very high energy gain obtainable

....
31. | J7 | d | IML Mod. 9 | 0890 | C | D.M. |

Which statement applies to fiber optic cable?

a. Since fiber optics work with very high carrier frequencies, bandwidths are significantly reduced.

b. Length for length, optical fibers have higher attenuation than wire cable.

c. Attenuation in optical fibers is dependent on assigned frequencies.

d. Unlike wire, glass does not pick up or generate electromagnetic interference.

....
32. | J8 | b | IML Mod. 9 | 0890 | C | D.M. |

What must be done if normal operations cause the absolute encoder to turn more than one revolution?

a. Add a gear train to limit the revolution to one.

b. Keep track of the number of revolutions.

c. Multiple revolution use is not permitted.

d. Use multiple absolute encoders in parallel.

....
33. | J8 | b | IML Mod. 9 | 0890 | C | D.M. |

What is a disadvantage of the optical encoder as compared to a mechanical encoder?

a. Computer compatibility

b. Effects of power surge

c. Retains original accuracy

d. Long use life

....
34. | J8 | c | IML Mod. 9 | 0890 | C | D.M. |

How many slots or steps will be required of an optical encoder that has a precision of .05 degrees per step?

a. 72

b. 720

c. 7,200

d. 72,000

....
35. | J8 | b | IML Mod. 9 | 0890 | C | D.M. |

How many slots in an optical disk are required for a resolution of one degree per slot?

a. 36

b. 360

c. 3,600

d. 36,000

Field	Contents	Field	Contents
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2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
3	Letter of correct answer	7	Writer(s)/reviewer(s)
[illegible]	Source (author, year of publication)	8	Accompanying artwork (ART)

....

1. | K1 | d | IML Mod. 3 | 0890 | C | M.M. |

Which number system has a base or radix of 16?

a. Binary

b. Octal

c. Decimal

d. Hexadecimal

....

2. | K1 | b | IML Mod. 3 | 0890 | C | M.M. |

What is the decimal equivalent of the BCD number: 1001 1000 0101?

a. 965

b. 985

c. 986

d. 1085

....

3. | K1 | a | IML Mod. 3 | 0890 | C | M.M. |

What is the binary equivalent of decimal 199?

a. 11000111

b. 11000110

c. 11000011

d. 01100011

....
4. | K1 | c | IML Mod. 3 | 0890 | C | M.M. |

What is the binary equivalent of the hexadecimal number A7?

a. 00100111

b. 01010111

c. 10100111

d. 10101110

....
5. | K2 | a | IML Mod. 3 | 0890 | C | M.M. |

Which type of logic gate will produce a high at the output ONLY when all input bits are logic high?

a. AND

b. NAND

c. OR

d. NOR

....
6. | K2 | c | IML Mod. 3 | 0890 | C | M.M. |

Which type of logic gate will produce a high at the output any time one or more input bits are logic high?

a. AND

b. NAND

c. OR

d. NOR

....
7. | K2 | d | IML Mod. 3 | 0890 | C | M.M. |

Which type of logic gate will produce a low at the output when any or all input bits are logic high?

a. AND

b. NAND

c. OR

d. NOR

....

8. | K2 | b | IML Mod. 3 | 0890 | C | M.M. |

What is the primary function of logic gates?

a. Add

b. Make decisions

c. Amplify

d. Convert from decimal to binary

....
9. | K3 | d | IML Mod. 3 | 0890 | C | M.M. | ART

Which truth table in Figure K3.1 is correct for a NAND gate?

a. A

b. B

c. C

d. D

....
10. | K3 | c | IML Mod. 3 | 0890 | C | M.M. | ART

Which logic gate has a truth table identical to that of the logic circuit shown in Figure K3.2?

a. AND

b. NAND

c. OR

d. NOR

....
11. | K3 | a | IML Mod. 3 | 0890 | C | M.M. |

Which logic circuit has only two possible input combinations?

a. Inverter

b. AND gate

c. NOR gate

d. Exclusive OR gate

....

12. | K4 | a | IML Mod. 3 | 0890 | C | M.M. | ART

In Figure K4.1, what type of output should the NOR gate have if all gates are good?

a. Logic low

b. Logic high

c. Floating output

....

13. | K4 | b | IML Mod. 3 | 0890 | C | M.M. | ART

In Figure K4.1, if test points 1 and 2 measure logic low and test point 3 measures logic high, which gate is faulty?

a. AND

b. OR

c. NAND

d. None

....

14. | K4 | a | IML Mod. 3 | 0890 | C | M.M. | ART

If the inverter in Figure K4.2 should fail and produce a logic high at its output, the output of the NOR would not change.

a. True

b. False

....

15. | K4 | b | IML Mod. 3 | 0890 | C | M.M. |

A 7400 series TTL I.C. can be substituted for a CMOS I.C. 400 series in the repair of logic circuits.

a. True

b. False

....
16. | K4 | b | IML Mod. 3 | 0890 | C | M.M. | ART

Which pin in Figure K4.2 is pin 1 of the I.C.?

a. A

b. B

c. C

d. D

....
17. | K5 | b | IML Mod. 3 | 0890 | C | M.M. |

One advantage of a digital system using SSI over LSI is the need for fewer integrated circuits.

a. True

b. False

....
18. | K5 | c | IML Mod. 3 | 0890 | C | M.M. |

Which I.C. classification contains a complete functional system typically found in microcomputers?

a. SSI

b. MSI

c. LSI

d. VLSI

....
19. | K5 | b | IML Mod. 3 | 0890 | C | M.M. |

In which classification does a 7490 counter fall?

a. SSI

b. MSI

c. LSI

d. VLSI

....
20. | K5 | b | IML Mod. 3 | 0890 | C | M.M. |

A Quad 4 input NAND gate is considered MSI.

a. True

b. False

....
21. | K6 | a | IML Mod. 3 | 0890 | C | M.M. |

Read-only memory is a non-volatile form of memory.

a. True

b. False

....
22. | K6 | b | IML Mod. 3 | 0890 | C | M.M. |

When power is removed from ROM, the contents of memory are lost.

a. True

b. False

....
23. | K6 | d | IML Mod. 3 | 0890 | C | M.M. |

Which type of ROM can be reprogrammed repeatedly?

a. PLA

b. ROM

c. PROM

d. EPROM

....
24. | K6 | c | IML Mod. 3 | 0890 | C | M.M. |

Which type of light is used to erase EPROMs?

a. Visible

b. Infrared

c. Ultraviolet

....
25. | K6 | b | Floyd D.F. | 0890 | C | M.M. |

A PLA is similar to a ROM in that a PLA contains both OR and AND matrices to perform a desired sum of the products logic equation.

a. True

b. False

....

26. | K7 | b | IML Mod. 3 | 0890 | C | M.M. |

What is the primary function of combinational logic circuits?

a. Count events

b. Decision making

c. Memory

d. Frequency division

....

27. | K7 | b | IML Mod. 3 | 0890 | C | M.M. |

Which type of gate would be used to create a decoder with an active low output?

a. AND

b. NAND

c. OR

d. None of the above

....

28. | K7 | d | IML Mod. 3 | 0890 | C | M.M. |

What type of combinational logic circuit is needed to convert BCD to decimal?

a. Multiplexer

b. Demultiplexer

c. Encoder

d. Decoder

....
29. | K7 | b | IML Mod. 3 | 0890 | C | M.M. |

How many inputs must a 1 of 32 decoder have?

a. 4

b. 5

c. 6

d. 32

....
30. | K7 | a | IML Mod. 3 | 0890 | C | M.M. |

A demultiplexer can be used to convert serial data to parallel data.

a. True

b. False

....
31. | K7 | d | IML Mod. 3 | 0890 | C | M.M. |

How many input combinations can a decoder with 20 inputs decode?

a. 20

b. 1,024

c. 65,536

d. 1,048,576

....
32. | K7 | b | IML Mod. 3 | 0890 | C | M.M. | ART

What decimal number is the decoder in Figure K7.1 decoding for?

a. 5

b. 10

c. 12

d. 14

....
33. | K7 | a | IML Mod. 3 | 0890 | C | M.M. |

A binary comparator can be constructed from exclusive OR gates.

a. True

b. False

....
34. | K7 | b | IML Mod. 3 | 0890 | C | M.M. |

A frequency counter is preferred to troubleshoot timing problems.

a. True

b. False

....
35. | K7 | a | IML Mod. 3 | 0890 | C | M.M. |

What is the odd parity bit for the binary word 10010001?

a. 0

b. 1

c. No parity bit needed

....
36. | K8 | d | IML Mod. 3 | 0890 | C | M.M. |

Which is the best test instrument to troubleshoot a frequency divider?

a. Digital voltmeter

b. Logic probe

c. Current probe

d. Frequency counter

....
37. | K8 | b | IML Mod. 3 | 0890 | C | M.M. |

A frequency counter placed in the event mode can measure frequency.

a. True

b. False

....
38. | K9 | d | IML Mod. 3 | 0890 | C | M.M. |

What is the output frequency on Q_3 of a BCD counter?

a. One-half the input frequency

b. One-fifth the input frequency

c. One-ninth the input frequency

d. One-tenth the input frequency

....
39. | K9 | b | IML Mod. 3 | 0890 | C | M.M. |

If all the clock inputs of a digital circuit are connected, the circuit would be classified as asynchronous.

a. True

b. False

....
40. | K9 | c | IML Mod. 3 | 0890 | C | M.M. |

What is another name for an asynchronous counter?

a. Trickle

b. BCD

c. Ripple

d. Decade

....
41. | K9 | d | IML Mod. 3 | 0890 | C | M.M. |

What is another name for a BCD counter?

a. Synchronous

b. Asynchronous

c. Pure binary

d. Decade

....
42. | K9 | c | IML Mod. 3 | 0890 | C | M.M. |

What is the maximum number a six-bit counter will count to?

a. 6

b. 36

c. 63

d. 64

....
43. | K9 | b | IML Mod. 3 | 0890 | C | M.M. |

A trailing edge-triggered JK flip flop, with J high and K low, will change states on every high to low transition of the clock input.

a. True

b. False

....
44. | K9 | a | IML Mod. 3 | 0890 | C | M.M. |

How many clock pulses are required to load a 16-bit word into a 16-bit parallel load register?

a. 1

b. 2

c. 8

d. 16

....
45. | K9 | a | IML Mod. 3 | 0890 | C | M.M. |

Shift registers are capable of multiplication or division by powers of two simply by performing a shift left or right.

a. True

b. False

....

46. | K9 | c | IML Mod. 3 | 0890 | C | M.M. |

What is another name for a sequencer?

a. Modulo counter

b. Johnson counter

c. Ring counter

d. Scaler

....

47. | K9 | b | IML Mod. 3 | 0890 | C | M.M. |

Modulus refers to the maximum number a counter will count to.

a. True

b. False

....

48. | K9 | a | IML Mod. 3 | 0890 | C | M.M. |

A counter can also be used as a divider.

a. True

b. False

....

49. | K10 | a | IML Mod. 3 | 0890 | C | M.M. |

In general, the accuracy of a digital multimeter is far greater than that of an analog multimeter.

a. True

b. False

....

50. | K10 | d | IML Mod. 3 | 0890 | C | M.M. |

Which is a characteristic of digital equipment?

a. High cost

b. More complex design

c. Less accuracy than analog

d. None of the above

....

51. | K11 | b | IML Mod. 3 | 0890 | C | M.M. | ART

Using a TTL Data Manual, what is the logic level necessary on pin 5 of a 74190 to cause the counter to count down?

a. Logic low

b. Logic high

c. Floating logic

d. None of the above

....

52. | K11 | d | IML Mod. 3 | 0890 | C | M.M. | ART

Using a TTL Data Manual, what is the fan-out on the Q_0-Q_3 outputs on a 74191 when Q_0-Q_3 pins are producing logic lows?

a. 1

b. 3

c. 5

d. 10

....

53. | K11 | c | IML Mod. 3 | 0890 | C | M.M. | ART

Using a TTL Data Manual, what is the required pulse width to Master Reset a 74174?

a. 7 ns

b. 12 ns

c. 18 ns

d. 20 ns

....

54. | K11 | a | IML Mod. 3 | 0890 | C | M.M. | ART

Using a TTL Data Manual, what is the active level of the clock input on a 74190?

a. Leading edge triggered

b. Trailing edge triggered

c. Negative edge triggered

d. Level triggered

....

55. | K11 | c | IML Mod. 3 | 0890 | C | M.M. | ART

Using a TTL Data Manual, how many inverters are inside a 74LS04 I.C.?

a. 2

b. 4

c. 6

d. 8

....
56. | K12 | a | IML Mod. 3 | 0890 | C | M.M. | ART

What type of circuit does Figure K12.1 illustrate?

a. ADC

b. DAC

c. CAD

d. BCD

....
57. | K12 | a | IML Mod. 3 | 0890 | C | M.M. |

What is a circuit called that converts light intensities into binary bits of data?

a. ADC

b. DAC

c. CAD

d. BCD

....
58. | K12 | c | IML Mod. 3 | 0890 | C | M.M. |

What type of conversion is necessary inside a digital voltmeter (DVM)?

a. None

b. Digital to analog

c. Analog to digital

d. Binary to digital

....

59. | K12 | a | IML Mod. 3 | 0890 | C | D.W. |

A five-bit DAC has an output of voltage of 0V with an input of 00000, and an output of 8V with an input of 11111. What is the approximate analog output with an input of 00111?

a. 2 volts

b. 3 volts

c. 4 volts

d. 5 volts

....

60. | K12 | d | IML Mod. 3 | 0890 | C | M.M. |

What is the resolution of a 16-bit DAC?

a. 1/16

b. 1/64

c. 1/256

d. 1/65536

....

61. | K12 | a | IML Mod. 3 | 0890 | C | M.M. |

The SAR type ADC includes a DAC as an integral part of the conversion process.

a. True

b. False

....
62. | K12 | d | IML Mod. 3 | 0890 | C | M.M. |

Which ADC has the fastest conversion time?

a. Counter ramp

b. Ladder

c. SAR

d. Flash

....
63. | K12 | a | IML Mod. 3 | 0890 | C | M.M. |

Sample rate is a term frequently used when discussing what type of conversion?

a. ADC

b. DAC

c. CAD

d. BCD

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....

1. | L1 | d | E&E | 0890 | C | D.W. |

What will cause a DC series motor to overspeed?

a. Excessive load

b. Open field

c. Open rotor

d. No load

....

2. | L1 | b | E&E | 0890 | C | D.W. |

What test results should be expected if a DC motor is running slow?

a. High voltage

b. Low voltage

c. No voltage

d. Constant voltage

....

3. | L1 | b | E&E | 0890 | C | D.W. |

What is the normal resistance of the armature of a DC motor?

a. High

b. Low

c. Open

b. Shorted

....
4. | L1 | a | E&E | 0890 | C | D.W. |

$$\% \text{ of speed regulation} = \frac{\text{Speed (no load) - Speed (full load)}}{\text{Speed full load}} \times 100$$

a. True

b. False

....
5. | L2 | c | E&E | 0890 | C | D.W. |

What will cause a single-phase induction motor to hum but not run?

a. Defective starter capacitor

b. Defective running winding

c. Defective starting winding

d. Defective field

....
6. | L2 | b | E&E | 0890 | C | D.W. |

What should be tested when a three-phase induction motor is overheating?

a. Resistance of the stator

b. Current of each phase

c. Starter winding

d. Fuse

....
7. | L2 | c | E&E | 0890 | C | D.W. |

What is the phase angle between the stator voltages of a three-phase motor?

a. In phase

b. 90 degrees

c. 120 degrees

d. 270 degrees

....

8. | L2 | b | E&E | 0890 | C | D.W. |

The speed of an induction motor can be changed by changing the applied voltage.

a. True

b. False

....

9. | L2 | c | E&E | 0890 | C | D.W. |

What test equipment should be used to test a stepper motor?

a. Voltmeter

b. Ohmmeter

c. Ammeter

d. Oscilloscope

....

10. | L3 | c | E&E | 0890 | C | D.W. |

What will cause a stepper motor to overheat?

a. Defective controller

b. Incorrect feedback path

c. Incorrect frequency

d. Incorrect voltage

....

11. | L3 | d | E&E | 0890 | C | D.W. |

What should be done first if a stepper motor is hunting?

a. Replace stepper motor.

b. Test the fuse.

c. Check for proper frequency.

d. Test for proper stepping codes.

....

12. | L3 | b | E&E | 0890 | C | D.W. |

A stepper motor is an analog device.

a. True

b. False

....

13. | L4 | b | E&E | 0890 | C | D.W. |

What is the resistance of a control solenoid winding?

a. High

b. Low

c. Open

d. Short

....

14. | L4 | c | E&E | 0890 | C | D.W. |

What item frequently fails in a contactor controller?

a. Terminal

b. Solenoid

c. Contact

d. SCR

....

15. | L4 | d | E&E | 0890 | C | D.W. |

Which item fails frequently in a solid-state controller?

a. Terminal

b. Solenoid

c. Contact

d. SCR

....

16. | L4 | a | E&E | 0890 | C | D.W. |

The SCR is the solid-state replacement for the relay.

a. True

b. False

....
17. | L5 | a | E&E | 0890 | C | D.W. |

Voltage regulation is a form of analog control.

a. True

b. False

....
18. | L5 | b | E&E | 0890 | C | D.W. |

Which term refers to an analog electronic control system that has no feedback?

a. Closed loop

b. Open loop

c. Pneumatic

d. Degenerative

....
19. | L5 | a | E&E | 0890 | C | D.W. |

What test equipment should be used to test an analog control device?

a. Voltmeter

b. Ohmmeter

c. Ammeter

d. Oscilloscope

....
20. | L6 | a | E&E | 0890 | C | D.W. |

What component is used as the input to a digital speed control?

a. Digital-to-analog converter

b. Comparator

c. DIP switches

d. Operational amplifier

....
21. | L6 | c | E&E | 0890 | C | D.W. |

What is the purpose of the error detection circuit?

a. Compares digital to analog voltage

b. Corrects errors from the DAC

c. Compares DAC voltage to motor speed voltage

d. Changes digital voltage to analog voltage

....
22. | L6 | d | E&E | 0890 | C | D.W. |

What is the purpose of the current-limiter resistor in a digital speed control?

a. Increase motor speed

b. Increase start-up current

c. Decrease stall current

d. Prevent overheating of the motor

....
23. | L6 | a | E&E | 0890 | C | D.W. |

What is the purpose of the motor speed measuring circuit?

a. Change frequency to voltage

b. Change voltage to frequency

c. Change digital to analog

d. Change analog to digital

....
24. | L7 | b | Hazen | 0890 | C | D.W. |

What does Delta depict in circuit analysis?

a. Wye arrangement

b. Triangular arrangement

c. Superposition arrangement

d. Nodal voltage arrangement

....
25. | L7 | a | Hazen | 0890 | C | D.W. |

What is the proper way to connect a motor using a Wye connection?

a. The field windings are connected in series.

b. The field windings are connected in parallel.

c. The phase must be observed.

d. The node must be observed.

....
26. | L7 | b | Hazen | 0890 | C | D.W. |

What arrangement is being used to connect a motor when the power is applied in series with the field windings?

a. Wye

b. Triangular

c. Superposition

d. Nodal voltage

....

27. | L7 | c | Hazen | 0890 | C | D.W. |

When converting a Wye-connected motor to a Delta connection, what must be done?

a. Reverse power wires.

b. Reverse field wires.

c. Change fields from series to parallel.

d. Change fields from parallel to series.

....

28. | L8 | a | IML Mod. 10 | 0890 | C | D.W. |

What is the purpose of the ADC in a motor speed control?

a. Frequency-to-voltage conversion

b. Generate an error signal

c. Change speed

d. Control speed

....

29. | L8 | b | IML Mod. 10 | 0890 | C | D.W. |

What is the purpose of the controller in a motor speed control?

a. Frequency-to-voltage conversion

b. Generate an error signal

c. Change speed

d. Control speed

....

30. | L8 | d | IML Mod. 10 | 0890 | C | D.W. |

What is the purpose of the comparator in a motor speed control?

a. Frequency-to-voltage conversion

b. Generate an error signal

c. Change speed

d. Control speed

....

31. | L8 | c | IML Mod. 10 | 0890 | C | D.W. |

What is the purpose of the speed control reference in a motor speed control?

a. Frequency-to-voltage conversion

b. Generate an error signal

c. Change speed

d. Control speed

....
32. | L9 | a | IML Mod. 10 | 0890 | C | D.W. |

In a programmable controller, the set-point module accepts input from an operator and controls the timing of the digital control.

a. True

b. False

....
33. | L9 | d | IML Mod. 10 | 0890 | C | D.W. |

Where is the binary signal from the input processed?

a. Transducer

b. Actuator

c. Output

d. Control

....
34. | L9 | c | IML Mod. 10 | 0890 | C | D.W. |

How is the set-point used in a programmable controller?

a. Output

b. Control

c. Reference

d. Input

....
35. | L9 | d | IML Mod. 10 | 0890 | C | D.W. |

What does the output module of a programmable controller drive?

a. Control

b. Set-point

c. Input

d. Actuator

....

1. | M1 | d | IML Mod. 4 | 0890 | C | D.M. |

When breadboarding circuits, what gage wire is usually used?

a. 14

b. 16

c. 18

d. 22

....

2. | M1 | c | IML Mod. 4 | 0890 | C | D.M. |

What type of wire is used for breadboarding?

a. Coaxial

b. Flat

c. Solid

d. Stranded

....

3. | M1, M2 | b | IML Mod. 4 | 0890 | C | D.M. |

Wirewrapping is a method of breadboarding used where low cost, temporary connections are desirable.

a. True

b. False

....

4. | M1, M2 | d | IML Mod. 4 | 0890 | C | D.M. |

Which statement best describes the wirewrapping method of circuit construction?

a. Easy to master

b. Least expensive

c. No special tools needed

d. None of the above

....

| M1, M2 | 5-e, 6-b, 7-d, 8-ab, 9-a | IML Mod. 4 |
0890 | C | D.M. |

Match the following terms and definitions.

5. Wire or rows of holes used to carry power or ground for convenient connection to circuit components

6. Springy metal fastener with components soldered to clip and wires inserted through hole

7. Round receptacle

8. Plastic circuit board with holes typically laid out in rows of five

9. Copper-coated fastener used for solderless connection of wires and components

a. Spring connector

b. Fahnestock clip

c. Wirewrap

d. Jack

e. Bus

ab. Solderless circuit board

....

10. | M3 | b | IML Mod. 4 | 0890 | C | D.M. |

What type of solder is most commonly used in electronics connections?

a. 60/40 acid core

b. 60/40 rosin core

c. 40/60 acid core

d. 40/60 rosin core

....

11. | M3 | c | IML Mod. 4 | 0890 | C | D.M. |

Which soldering device would be best suited for making soldered connections on a printed circuit board?

a. Soldering gun, 100 watt

b. Soldering iron, 100 watt

c. Soldering iron, 10-35 watts

d. Desoldering iron, 20 watt

....

12. | M3 | d | IML Mod. 4 | 0890 | C | D.M. |

What tool is used to prevent thermal damage to components when soldering/desoldering?

a. Component lead cleaner

b. Heat shrink tubing

c. Thermal wire stripper

d. Heat sink

....
| M3, M4, M5 | 13-e, 14-ab, 15-b, 16-d, 17-a | IML Mod.
4 | 0890 | C | D.M. |

Match terms on the right with definitions on the left.

13. Device that draws heat from soldered connection to prevent damage to component

14. Liquid or solid which, when heated, cleans and protects surfaces to be soldered

15. Material used during soldering to help ensure a good bond between the solder and metal surfaces

16. Ability of molten solder to flow over and fuse completely with metal surfaces to which it is applied

17. Mechanical pressure applied to ensure a good electrical connection

a. Crimping

b. Rosin

c. Wetting

d. Tinning

e. Heat sink

ab. Flux

....
18. | M4 | b | IML Mod. 4 | 0890 | C | D.M. |

When replacing components on a printed circuit board, the length of the leads are NOT important.

a. True

b. False

....
19. | M4 | a | IML Mod. 4 | 0890 | C | D.M. |

An acceptable method of replacing discrete components on a printed circuit board is to clip the old leads and solder the new component leads to the ends attached to the board.

a. True

b. False

....
20. | M5 | c | IML Mod. 4 | 0890 | C | D.M. |

What is the proper action to take when a "run" has been damaged on a printed circuit board?

a. Repair using "like-new" method

b. Repair using "crushing" method

c. Repair using "bridge" method

d. Cannot be repaired

....
21. | M5 | b | IML Mod. 4 | 0890 | C | D.M. |

What is the name of the round, donut-shaped copper terminal connection point on a printed circuit board where component lead wires are attached?

a. Run

b. Pad

c. Foil

d. Wick

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
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	Source (author, year of publication)	8	Accompanying artwork (ART)

....

1. | N1 | b | IML Mod. 7 | 0890 | C | M.M. |

A block diagram shows a detailed schematic diagram of an electronics system.

a. True

b. False

....

2. | N1 | a | IML Mod. 7, pg. 44 | 0890 | C | M.M. | ART

In Figure N1.1, the audio level is controlled after one stage of amplification.

a. True

b. False

....

3. | N1 | b | IML Mod. 7, pg. 44 | 0890 | C | M.M. | ART

Figure N1.1 shows the complete block diagram for a stereo receiver.

a. True

b. False

....
4. | N1 | c | IML Mod. 7, pg. 95 | 0890 | C | M.M. |
ART

Refer to Figure N1.2. A signal is injected at TP2 and heard at the speaker. No signal is heard when the signal is injected at TP3. Which stage is faulty?

a. Detector stage

b. Audio amplifier

c. Driver amplifier

d. None

....

5. | N2 | d | IML Mod. 7 | 0890 | C | P.M. |

What section of the radio should be checked first if no sound is heard from the speaker?

a. Antenna

b. RF section

c. IF section

d. Audio output section

....

6. | N2 | a | IML Mod. 7 | 0890 | C | P.M. |

What section of the equipment should be checked first if the equipment cannot be turned on?

a. Power section

b. Signal section

c. Output section

d. Meter circuits

....

7. | N2 | c | IML Mod. 7 | 0890 | C | P.M. |

What section of the equipment should be checked if the system has an AC hum?

a. Middle section

b. Output section

c. Input power section

d. Meter circuits

....

8. | N2 | b | IML Mod. 7 | 0890 | C | P.M. |

When the AC line fuse continues to blow, what should be checked first?

a. Signal path

b. Power supply

c. Output section

d. Amplifier section

....
9. | N3 | a | IML Mod. 7 | 0890 | C | D.M. |

When troubleshooting by signal injection, start near the output and work toward the input.

a. True

b. False

....
10. | N3 | a | IML Mod. 7 | 0890 | C | D.M. |

When troubleshooting by signal tracing, start near the input and work toward the output.

a. True

b. False

....
11. | N3 | c | IML Mod. 7 | 0890 | C | D.M. |

Which is an acceptable signal source when using the signal injection method of troubleshooting a stereo amplifier?

a. RF oscillator

b. Video pattern generator

c. Function generator

d. None of the above

....
12. | N3 | c | IML Mod. 7 | 0890 | C | D.M. | ART

See Figure N3.1. Using an oscilloscope to troubleshoot an AM radio with a problem of hum in the output, the technician finds no hum present at point L. What would be the next point to check?

a. J

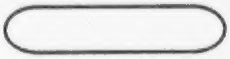
b. K

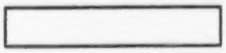
c. M

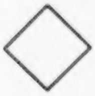
d. N

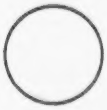
....
| N4 | 13-ab, 14-e, 15-a, 16-c | IML Mod. 7 | 0890 |
C | D.M. | ART

The proper use of flowcharts is very helpful in troubleshooting equipment. Match the following terms with standard symbols.

13. 

14. 

15. 

16. 

a. Make decision

b. Adjust

c. Connector

d. Terminate

e. Process

ab. Begin

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1	Unique item number	5	Date (MMYY)
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[illegible]	Source (author, year of publication)	8	Accompanying artwork (ART)

....

1. | Leadership 1 | c | VICA | 0889 | C | Fred Smith |

Why should students NOT enroll in occupational training programs?

a. To work toward a career

b. To develop business and industry contacts

c. To avoid taking math, science, or English classes

d. To work toward financial independence

....

2. | Leadership 1 | a | VICA | 0889 | C | Fred Smith |

Only one VICA club per school is allowed.

a. True

b. False

....

3. | Leadership 1 | d | VICA | 0889 | C | Fred Smith |

How many VICA districts does Missouri have?

a. 3

b. 5

c. 7

d. 9

....
4. | Leadership 1 | b | VICA | 0889 | C | Fred Smith |

In which national VICA region is Missouri located?

a. 3

b. 4

c. 5

d. 6

Field	Contents	Field	Contents
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....
5. | Leadership 2 | b | VICA | 0889 | C | Fred Smith |

Personal values rarely affect career choices.

a. True

b. False

....
6. | Leadership 2 | a | VICA | 0889 | C | Fred Smith |

A career should align with one's personal values, interests, and abilities.

a. True

b. False

....
7. | Leadership 3 | b | VICA | 0889 | C | Fred Smith |

Effective decision making can be broken down into six steps.

a. True

b. False

....
8. | Leadership 3 | b | VICA | 0889 | C | Fred Smith |

A new supervisor should be liked by all workers in order to be effective.

a. True

b. False

....
9. | Leadership 3 | d | VICA | 0889 | C | Fred Smith |

Which goal should a supervisor work toward in order to succeed and improve worker moral?

a. Keep attention on getting work done

b. Be as fair as possible

c. Avoid taking a worker's negative feelings personally

d. All the above

....
10. | Leadership 3 | a | VICA | 0889 | C | Fred Smith |

To be more productive, workers need ways to measure and use time more effectively.

a. True

b. False

233

Field	Contents	Field	Contents
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....

11. | Leadership 4 | d | VICA | 0889 | C | Fred Smith |

Which trait or traits do employers expect from their employees?

a. Cooperation and acceptance of evaluation

b. Honesty

c. Initiative

d. All the above

....

12. | Leadership 4 | d | VICA | 0889 | C | Fred Smith |

Which characteristic should employees expect from their employers?

a. Understanding of job requirements

b. Fair payment for labor

c. Equal treatment for all employees

d. All of the above

....

13. | Leadership 4 | a | VICA | 0889 | C | Fred Smith |

Effective communication, care for people, flexibility, dependability, optimism, and perseverance are traits of good leaders.

a. True

b. False

....
14. | Leadership 5 | a | VICA | 0889 | C | Fred Smith |

Good table manners include entering into table conversation.

a. True

b. False

....
15. | Leadership 5 | b | VICA | 0889 | C | Fred Smith |

A coat room clerk at a restaurant is usually NOT tipped.

a. True

b. False

....
16. | Leadership 5 | a | VICA | 0889 | C | Fred Smith |

Employees should stand when an authority figure (employer) joins them for a meal.

a. True

b. False

....

17. | Leadership 6 | b | VICA | 0889 | C | Fred Smith |

It is a good idea to use big words when writing in order to impress people.

a. True

b. False

....

18. | Leadership 6 | a | VICA | 0889 | C | Fred Smith |

Self-concept affects verbal communication.

a. True

b. False

....

19. | Leadership 6 | a | VICA | 0889 | C | Fred Smith |

When speaking, always use a vocabulary that others can understand.

a. True

b. False

....
20. | Leadership 7 | a | VICA | 0889 | C | Fred Smith |

Professionals respect themselves and others.

a. True

b. False

....
21. | Leadership 7 | a | VICA | 0889 | C | Fred Smith |

A person's code of ethics defines his or her principles or standards of right and wrong.

a. True

b. False

....
22. | Leadership 7 | a | VICA | 0889 | C | Fred Smith |

A professional code of ethics includes both legal and moral standards.

a. True

b. False

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....

23. | Leadership 8 | a | VICA | 0889 | C | Fred Smith |

Appropriate business dress for women would include a skirt.

a. True

b. False

....

24. | Leadership 8 | a | VICA | 0889 | C | Fred Smith |

Appropriate business attire for men would include a traditional dark suit.

a. True

b. False

....

25. | Leadership 8 | a | VICA | 0889 | C | Fred Smith |

Fashion accessories reflect the self-image of an individual.

a. True

b. False

....

26. | Leadership 8 | a | VICA | 0889 | C | Fred Smith |

Getting plenty of sleep and avoiding junk food can improve personal appearance.

a. True

b. False

....

27. | Leadership 9 | a | VICA | 0889 | C | Fred Smith |

A resume is a well-organized overview of what one has to offer an employer.

a. True

b. False

....

28. | Leadership 9 | a | VICA | 0889 | C | Fred Smith |

A letter of application should ask an employer for an interview.

a. True

b. False

....

29. | Leadership 9 | a | VICA | 0889 | C | Fred Smith |

The local chamber of commerce can help people research employers.

a. True

b. False

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....
30. | Leadership 10 | a | VICA | 0889 | C | Fred Smith
|

When parliamentary procedures are used at a meeting, only one subject at a time should be discussed.

a. True

b. False

....
31. | Leadership 10 | a | VICA | 0889 | C | Fred Smith |

Parliamentary procedure calls for the finishing of old business before new business is started.

a. True

b. False

....
32. | Leadership 10 | a | VICA | 0889 | C | Fred Smith |

Parliamentary procedure calls for standing committee reports to be given before special committee reports.

a. True

b. False

....

33. | Leadership 10 | a | VICA | 0889 | C | Fred Smith |

Proper use of the gavel signals members to stand or sit.

a. True

b. False